THE MAGAZINE FOR AUSTRALIAN RADIO AMATEURS

Volume 75 Number 6
June 2007

Amateur Radio

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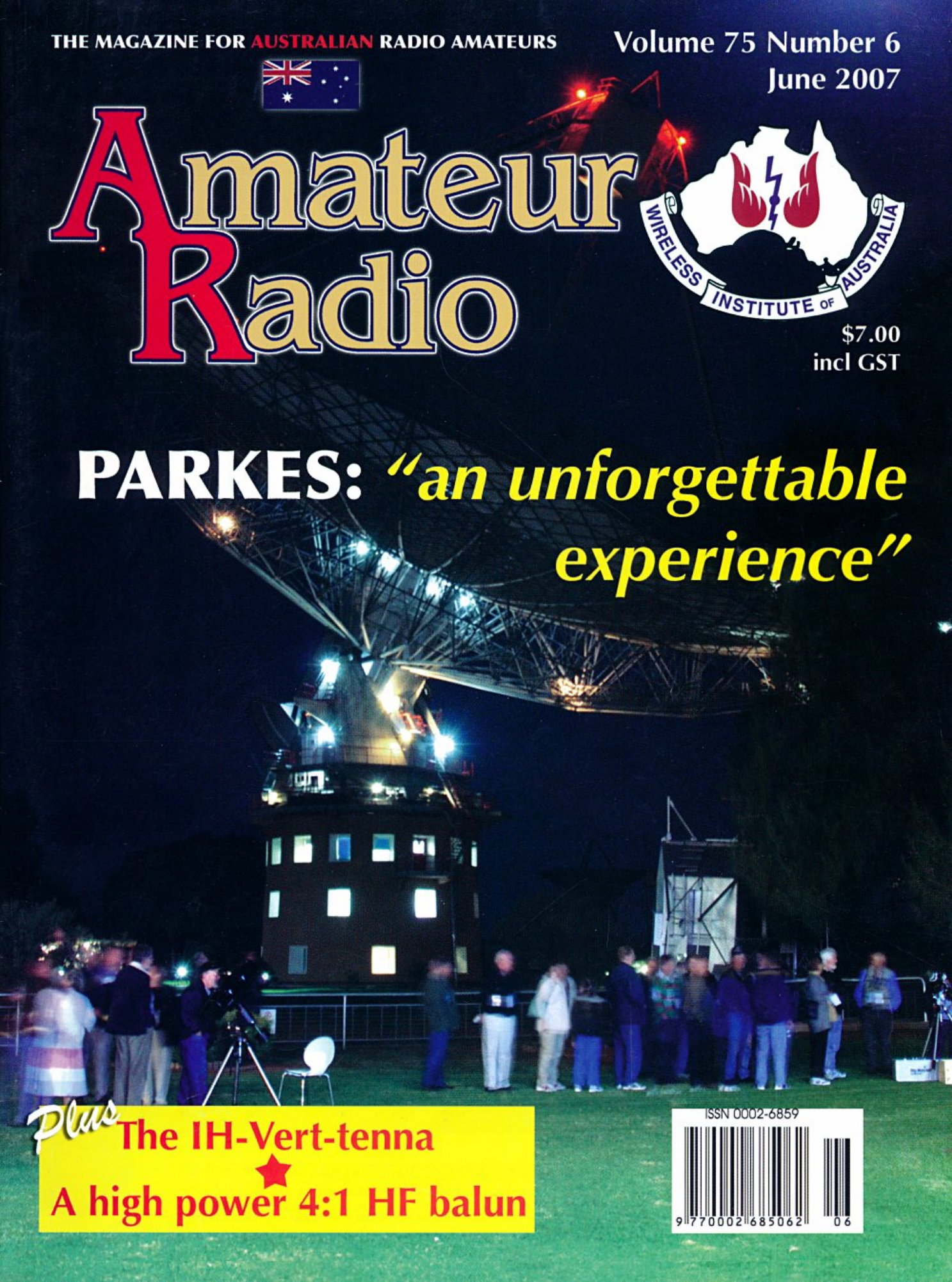

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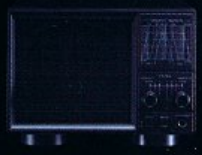

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Amateur Radio

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GENERAL

TECHNICAL

COLUMNS

Our Cover this month

Delegates to the WIA 2007 AGM visit "the Dish" in Parkes. See more pictures on pages 28 and 29. Cover photo by Chris Morley VK3CJK.

Contributions to Amateur Radio

Amateur Radio is a forum for WIA members' amateur radio experiments, experiences opinions and news. Manuscripts with drawings and/or photos are always welcome and will be considered for publication. Articles on disc or email are especially welcome. The WIA cannot be responsible for loss or damage to any material. A pamphlet, 'How to write for Amateur Radio' is available from the National Office on receipt of a stamped self-addressed envelope.

Back Issues

Back issues are available directly from the WIA National Office (until stocks are exhausted), at $4.00 each (including postage within Australia) to members.

Photostat copies

When back issues are no longer available, photocopies of articles are available to members at $2.50 each (plus an additional $2 for each additional issue in which the article appears).

Disclaimer

The opinions expressed in this publication do not necessarily reflect the official view of the WIA and the WIA cannot be held responsible for incorrect information published.

Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs; that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

Wireless Institute of Australia

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Representing
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Editorial Comment

Peter Freeman VK3KAI

Delivery of AR

Well, I guess that this may be telling – how many of you read my Editorial? An issue of which the Publications Committee (PubComm) has been aware for some time is the apparent delays in our distribution system to some areas. Some members are reporting that they see the magazine on the news stands before their "subscription" copy arrives via the mail. The factors are many, not the least of which is the very efficient system used for newsagent delivery. To allow all involved in the publication and distribution chain to gain a better, fact-based understanding of the realities, I ask all with access to email to send us a brief message (via email):

Send your email to:

ar_delivery@wia.org.au

Subject: June AR delivery

Keep the body of the message simple: Your callsign, postcode and date of delivery via the mail (e.g. VK3KAI, 3842, 9 May – the details for arrival here of the May issue – but use the date for THIS issue!).

We will collate the data to assist us in future planning of production schedules.

Software revisions

One of the "joys" of life (and often the source of great frustration) is the updating of computer software and/or hardware! Most who have purchased a new "PC" computer recently find the latest version of the Windows® operating system installed. Past experience has made many wary of being an "early adopter" of new software, including (or especially) OS software!

The change brought a new version of the "standard" office "productivity" suite. This may be fine for some, but the latest version of Office® brings with it a completely new document format. Those with an older version cannot read a file created with the new software without the appropriate converter file.

I ask that all contributors, until advised otherwise, save any document created with the new MS Office 2007 suite in the MS Office 2003 format. This is a simple task – do not just hit Save when you have finished the document. Instead (or in addition), use the File Save As command, and choose the Office 2003 (e.g. Word 2003) format to save the file, using a different file name if necessary.

On this broad subject, it was interesting to note at the Parkes AGM weekend that several functions at the Radio Telescope, notably including the antenna pointing software, is still running on a PDP-11 computer with largely the original software: reliable hardware and software combinations are far more important in some applications than upgrading to the "latest and greatest"!

AGM weekend

What a terrific (unofficial) long weekend – I have just returned from Parkes. It was a long weekend in many senses. Within an hour of commencing my journey, I struck a cold front that was moving into eastern Victoria. The drive suddenly required a significantly higher level of concentration! In due course, Robert VK3KRB and I commenced the long road journey, via Shepparton, Tocumwal, Narrandera, West Wyalong (with a few hours sleep) and finally on to Parkes.

On arrival, Robert checked that all arrangements were in train, including those at the Radio Telescope. This "check" had an unexpected benefit – Robert and I had a personalised tour as a "preview" of the planned tours on Sunday. On the Friday afternoon, several Directors, partners and a few others, were taken on the tour, so increasing the total number of members that could participate in Sunday's tour.

The rest of the weekend proceeded well. An excellent crowd attended the AGM and provided a range of questions and valuable feedback during the Open Forum. The Dinner included an excellent presentation by Mike VK3UBM on amateur rocketry and ATV, and was followed by a screening of the movie "The Dish". The former generated much interest, the latter much mirth on several occasions! On Sunday, approximately 120 people participated in the technical tours – a rare privilege! Our thanks must go to Brett, John, John and all others from the facility involved. Special thanks must go to Robert VK3KRB for coordinating the program for the weekend. My perception was that all who attended had a great time.

ar

Michael Owen VK3KI

Playing with numbers

In the statutory Report of the Directors to the WIA 2007 Annual General Meeting at Parkes on 5 May 2007 and in my Report to the Open Forum held immediately after the Annual General Meeting, there are some interesting statistics.

Let us first of all look at the WIA Examination Service.

By May 2006, 7 months after the new WIA Assessment system commenced, there were 93 accredited and registered WIA Assessors and some 15 Nominated Assessors. A year later, in April 2007, there were 154 WIA Assessors and still 15 Nominated Assessors, from right across Australia.

Now look at what has happened since 19th October 2005, the day the Radiocommunications Licence Conditions (Amateur Licence) Amendment Determination 2005 (No. 1) came into effect, the first day on which a Foundation Licence could be issued.

Since then, the WIA office has prepared some 2,302 Foundation Assessment Packs, of which 1,478 have been returned.

In other words, 1,478 Foundation licence assessments have been attempted since the introduction of the Foundation licence. It also means that on that day there were 824 Packs in the hands of Assessors or on their way back to the office.

In the November 2006 *AR* I was able to report that on 29 September 2006, just three weeks short of a year from the coming into force of the new licence structure, the WIA issued the 1,000th certification of qualification for an Amateur Operator Certificate of Proficiency (Foundation).

As stated in the Report of Directors, during the 2006 calendar year 1,150 Foundation assessments were processed with 1,065 candidates successful in obtaining the Foundation qualification.

So, we seem to be running, in the first 18 months or so, at the rate of 1,000 new Foundation licensees a year.

As at 1 April 2007, there were 1,186 current Foundation licences on issue.

The following table sets out the distribution of Foundation licensees by state/territory on 1 April 2007, with the figures a year earlier shown in brackets:

VK1	VK2	VK3
30 (20)	338 (138)	398 (161)
VK4	VK5	VK6
129 (57)	141 (63)	67 (24)
VK7	VK8	VK9
75 (38)	7 (1)	1

But what about the other classes of licence?

The introduction of Assessment Packs for Standard and Advanced Theory and Standard/Advanced Regulation was delayed until about March 2006. Since then, to mid May 2007, the WIA has prepared 574 Standard Theory Packs, of which 193 have been returned, 406 Advanced Theory Packs of which 99 have been returned and 613 Standard/Advanced Regulation Packs of which 237 have been returned.

In the 2006 calendar year, 85 separate practical assessments (apart from practical assessments part of the Foundation qualification) were processed, 171 Standard Theory assessments were processed, 87 Advanced Theory assessments were processed and 208 Regulations were processed, in all 1,701 assessments being processed during the period.

As at 1 April 2007, the ACMA records show that there were 11,648 Advanced Licences current, 1923 Standard licences current, 1,186 Foundation licences current, 370 Repeater and 34 Beacon licences current in Australia.

We are still working on extracting more precise figures on the number of people who have taken advantage of the Foundation Licence as their point of entry into amateur radio, but at least anecdotally it seems that many are embarking on up-grading. Even in the very short period since the change of licence structure, it seems that perhaps something close to 20% of people qualifying as Foundation licensees are starting to upgrade, and indeed, many have achieved their goal.

Again anecdotally, one hears people saying that they had lost interest in amateur radio when they found the Novice too hard, and work and family commitments were more important, but the Foundation licence led them back into amateur radio, often leading them to up-grade very soon after qualifying at the entry level.

All of this is confirmed when one looks at the ACMA licence figures.

ACMA reports the total number of amateur apparatus licences in force on 30 June each year, and we can count the total as at the date of the licence data CD supplied by ACMA.

It should be stressed that these figures are all licences, and so include repeater and beacon licences, licences such as the "WI" and "WIA" licences held by the Institute as well as the multiple licences held by some people.

But the figures certainly do tell a story.

30 June 2001	15,017
30 June 2002	14,536
30 June 2003	14,363
30 June 2004	14,047
30 June 2005	14,041
30 June 2006	14,475
1 April 2007	15,161

I am sure that earlier figures would have shown that the continuing decline started some years earlier, but it is obvious that the number fell each year until June last year, and by April this year there were more amateur licences on issue than there were at the end of June 2001.

So, what about WIA membership?

We know that one of the drivers for the structural change of the WIA was the inexorable decline of membership for very many years up to the first half of 2004.

The WIA has generally reported membership figures as at its balance date of 31 December each year, and over the last 3 years we have reported membership in May each year at the time of the AGM and Open Forum.

I believe that in mid 2005 there were about 3,494 members. That figure was very difficult to measure, as membership was in transition from membership of a Division to membership of the single national entity.

But after that we have membership figures as follows:

31 December 2005	3,851
May 2006	3,870
31 December 2006	4,114
May 2007	4,246

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WIA News

WIA announces nominated members of Advisory Committees

The WIA Board has adopted Regulations to govern the Advisory Committees that will be created this year. This is described in detail in the "Comment" in April *Amateur Radio*, and a notice calling for nominations was published in last month's *AR*.

There will be an Advisory Committee for each State and the Northern Territory, and each Advisory Committee will consist of four people, three elected by the WIA members in the area of the Committee and one nominated by the WIA, called the Nominated Member.

The WIA Board is very pleased that the following people have agreed to be Nominated Members:

New South Wales, Owen Holmwood VK2AEJ

Victoria, Bryan Pliatsios VK3HXR

Queensland, Don Wilschefski VK4BY

South Australia, David Box VK5OV

Western Australia, Neil Husk VK6BDO

Tasmania, David Potter VK7YUM

Northern Territory, Garry Woods VK8GW

2007 AGM

The WIA's Annual General Meeting was held at the Leagues Club, Parkes, New South Wales, on Saturday 5 May 2007.

Before the meeting, many of those attending participated in a barbeque in a nearby park.

Highlight of the Annual General Meeting, which is conducted very much as a formality, was the submission of audited accounts showing a surplus of $8,000. Glenn Dunstan VK4DU who had been a Director since the restructure of the WIA to a national body in May 2004 retired, receiving warm tributes for his contribution. Peter Young VK3MV, who had been elected by the postal ballot of members, was welcomed as a Director.

It was followed immediately by the Open Forum, where reports covering all aspects of the WIA's activities were submitted and discussed. Topics covered included examinations, awards, the bookshop, BPL, clubs, contests, emergency communications, history, the ITU and WRC 07, IARU, the news service, the National Technical Advisory Committee, publications, QSLs, repeaters and standards.

Secretary Ken Fuller VK4FU had organised the written reports into a handsome book. A copy was given to each participant on registration.

In presenting a report on behalf of the Board, the President Michael Owen VK3KI stressed the growth in total amateur licence numbers, which had been slowly declining each year since at least 2001. The "Comment" in this month's AR looks at these figures in detail.

A highlight of the Open forum was the presentation of awards to members.

The first award to a Foundation licensee was the award of a President's Commendation to Haydon McManus, VK3FRST, the Scouts Australia Coordinator of VI3JAM at the 21st Australian Jamboree, so successfully promoting amateur radio.

Justin Giles-Clark VK7TW, President of the Radio and Electronics Association of Southern Tasmania, was awarded the Ron Wilkinson Award for all he has done in response to the major BPL trials in Hobart.

The first Chris Jones Award was presented to Mal Johnson, VK6LC, the WIA Awards Manager since 2001. A separate item below deals with this important award.

Around 130 people attended the dinner on Saturday night, watching the Australian film *The Dish* afterwards.

Sunday was time for visiting the CSIRO radio telescope at the Parkes Observatory, "the Dish", the highlight of the weekend's activities, and the subject of a separate report in this month's AR.

The WIA wishes to thank John Reynolds, OIC of the Facility, John Smith, Visitors Centre Manager, John Sarkissian Operations Scientist and in particular Brett Dawson VK2CBD, second in charge of the Facility, who helped in so many ways with the planning of the weekend.

In total, 139 people were registered for various activities.

The weather was perfect, and the weekend was undoubtedly a success.

WIA Board's 2007 appointments

At its meeting immediately following the Annual General Meeting and Open Forum at Parkes, NSW, on 5 May 2007, the WIA Board reappointed Michael

continued on page 9

WIA makes first Chris Jones Award

WIA President Michael Owen VK3KI announced the first Chris Jones Award at the 2007 Open Forum at Parkes NSW on 5 May 2007.

The Award is a handsome glass trophy and features a picture of the late Chris Jones VK2ZDD and the following wording:

"The Chris Jones Award honours the memory of a man who was dedicated to the advancement of amateur radio and whose unfailing commitment and vision led to a new Wireless Institute of Australia and whose unfailing courtesy and genuine friendliness is fondly remembered by all who knew him.

It is awarded to radio amateurs who have made an exceptional contribution to amateur radio and the Wireless Institute of Australia."

The Award was presented to Mal Johnson VK6LC in recognition of his great contribution to amateur radio as the WIA Awards Manager.

The only other national society to conduct a DX Century Club award program is the ARRL, which commenced in November 1945. The WIA Program commenced in 1947.

Mal has been Awards Manager since 2001, and has computerized the program, and over the last few years managed the transition from a federal to a national program, also introducing a number of new and innovative and very attractive awards.

In presenting the Award, Michael Owen read from a letter from David Rankin 9V1RH/VK3QV, a long time resident of Singapore, acknowledging Mal's work in streamlining the award submission procedures and commenting that "with Mal as Awards Manager the WIA is, in my opinion, fulfilling a need and want in the DX world."

see also inside back cover

More mysterious manifestations of the
"Rusty Bolt Effect"

Felix Scerri VK4FUQ

I'm starting to wonder if I've been cursed to suffer an endless life of experiencing bizarre manifestations of the "rusty bolt effect", in all its guises! I've previously described the strange fault that involved apparent loss and non linearity in my 2 m antenna transmission line system. Well, I've just had another strange incident although, thankfully, it was identified very quickly and remedied. However, this latest experience has left me with the indelible impression that "non linear" junctions are waiting to attack at the slightest provocation!

One of my books on RF interference has numerous documented examples of mysterious rectification and interference caused by "unpowered" devices containing solid state devices. Well, I can now add one more to the list! One of my other passions is wideband AM reception and, as a consequence of this, I have designed and built a number of novel AM detector arrangements, using bipolar transistors or field effect transistors.

One of these detectors, when "unpowered", produced an intermod on the 2 m band in conjunction with another signal. This was discovered after I recently noticed a number of new "intermods" on the 2 m band. I was able to hear some very distorted audio in the intermod which was identified as a local AM radio station. Thus alerted, I began to think about the possibilities and I realized that my crystal set front end (with a "long wire" antenna attached), was connected to my FET based "infinite impedance detector", and that it was tuned to the station that I had identified in the distorted intermod audio. This "infinite impedance detector" was powered by its own 12 volt battery supply and the circuit was switched "off". I waited for the intermod on 2 m to reappear and, when it did, I switched the power supply to the module "on", and the intermod instantly disappeared! Got it in one!

What was particularly interesting about this case was the fact that the detector module only caused a problem when completely "unpowered". As the intermod noticed was not continuously evident, only intermittent, it would seem that another intermittent signal was part of this "mix" as well! It was also likely that harmonics of the original frequencies (possibly produced through further incidental rectification), were heavily involved in the process!

The possibilities were complex and quite bewildering! As indicated on the S meter of my 2 m rig, these intermods were quite strong (around an indicated S7 or so) showing that quite respectably strong signal levels were involved. It also showed that one single "unpowered" MPF102 junction FET made a nice RF mixer.

There are many other similar non linear devices lurking in the background waiting to pounce, given some RF energy to "mix". Technically, this is all very interesting, but it is "painful".

Please, no more!

ar

2007 WIA Grants scheme launched

Ken Fuller VK4KF Secretary WIA

Monday 16th July is the closing date for applications for the WIA Club Grants Scheme for 2007. Full details of the rules for the scheme can be obtained from the WIA Web site, together with a template setting out the suggested application headings for an executive summary, identifying how the club seeks to meet the objectives of the scheme and guidance regarding supporting documentation.

WIA President Michael Owen said that the Board was pleased with the results of the 2006 scheme and believed that there was overall support from members for a continuation of the grant scheme. In 2006, some 18 project proposals were received and 5 received financial support from the scheme. The Board had decided to maintain the rules unchanged from those that applied last year.

The WIA Board has again allocated $5,000 for distribution to qualifying Affiliated Clubs. The object of the scheme is to promote and advance amateur radio, the WIA and its Affiliated Clubs by supporting useful and/or innovative projects undertaken or to be undertaken by Affiliated Clubs. Affiliated Clubs with a membership including at least 50% WIA members qualify to participate, though the Board has discretion to allow a lesser percentage in special circumstances.

Michael said that the 2007 Grant Committee would be Don Wilchefski VK4BY, Deane Blackman VK3TX and Wally Howse VK6KZ. The Committee would recommend to the Board the projects that should be supported and the amount to be allocated to each supported project. "I urge affiliated clubs to participate in this opportunity" Michael said; "however, it is most important that clubs read the rules very carefully".

ar

The 'IH-Vert-tenna'

Paul Stampton VK3IH
stampton@dcsi.net.au

Build the 'IH-Vert-tenna': an easily constructed, adaptable antenna for lightweight portable SSB or FM VHF/UHF use. Parts are easy to find and total cost is less than $30 with all new parts.

An imminent overseas trip saw the need for a versatile antenna system for HF and VHF/UHF. A quick look back through Amateur Radio saw the construction of a QRP L Match tuner for HF and a 'Versatenna', a design by Peter Parker VK3YE (AR Feb 2003). This antenna was a two element beam on 2 m and a ¾ wave dipole on 70 cm constructed from 'rabbit ears' antennas that plug into the rear of television sets. This antenna was tested on backpacking type camping trips and proved to be quite a good system. However, further thought regarding the operating requirements on the overseas trip that would see use in a motor-home, and borrowed houses as well as commercial apartments, led to the design of the 'IH-Vert-tenna'.

This design is stable on a small flat surface such as a table, veranda rail, or metal motor-home roof. It can utilise commercial multi-band antennas (such as the one supplied with the Yaesu FT-817, or most handhelds) or higher gain antennas such as telescopic 5/8th wave antennas. Part of this article details some homebrew whips that will easily outperform antennas supplied with most radios. The IH-Vert-tenna can quickly be switched from vertical polarisation, for use with FM repeaters and the like, to horizontal polarisation (common with SSB operation) in an instant.

Construction is easy, using only the simplest of tools and cheap materials, and the finished product is an excellent performer.

Figure 1: The set up in the field for FM or SSB use on 2 m. This antenna has been used in three states and 15 countries (as G3ZDR/p) with great results.

Parts

You will need:

- a TV antenna, the type with the two telescopic whips each over 60 cm long on a large plastic base with feet, and a 75 Ω lead. Dick Smith Electronics (DSE) L4015 or similar (I have found some low cost examples in supermarkets.)
- a BNC panel socket (the round style is easier to work with than the square base style) DSE P2220
- a BNC or PL259 plug depending on the antenna connection on your radio.
- approximately 3 m of RG-58 50 Ω coaxial cable (or, for a low budget option, you can use the 75 Ω TV coax supplied already fitted - it will make little difference in this application)
- a vertical antenna for the band in use such as the three band antenna supplied with the FT-817 or any hand held antenna. (I will also show you how to make a low cost one yourself).
- a DPDT (double pole – double throw) switch that can handle the

power output of the transceiver. A DSE P7670 should be fine up to 20 W or so.

Construction

Figure 3 shows the simple construction technique.

Unscrew the base of the TV antenna and remove the balun if there is one (it is the little thing with wire wrapped around it). You should also remove the 75 Ω coax now if you want to replace it with 50 Ω RG-58.

Drill two holes in the top of the plastic base, one sized for the BNC socket in the middle of the plastic top of the antenna and the other for the DPDT switch in a convenient location nearby.

Mount the switch and BNC socket and then connect with short pieces of stiff wire (enamelled wire with the enamel scraped off the ends is ideal) as per the picture of the IH-Vert-tenna in Figure 2, and the internal wiring in Figure 3. At this time you should also connect the coaxial cable and the BNC or PL259 plug to your radio.

This completes the basic construction!

Operation

You should now have the IH-Vert-tenna sitting on the table beside you and a whip of your choice mounted on the BNC socket you fitted in the lid of the plastic base. Extend the telescopic whips out to be a ¼ wave on the 2 m band each side (i.e. around 49 cm). Flip the DPDT switch to the position that connects only the horizontal TV rabbit ears to the coax. You can now transmit a low power carrier and adjust the length for minimum SWR.

You are now on the air with horizontally polarised SSB! Simply adjust the length for 70 cm band use (ie around 16 cm each side) or fully extend the whips and add a little extra length with insulated wire on a crocodile clip to resonate on the 6 m band (total length each side of around 132 cm) if the whips on your IH-Vert-tenna aren't long enough. The insulated wire can dangle down - it won't affect your signal noticeably.

To change to FM vertically polarised transmission, simply flip the switch and the two rabbit ears now become the 'ground plane' for the vertical whip attached to the BNC socket, then adjust the whips to around ¼ wave each and

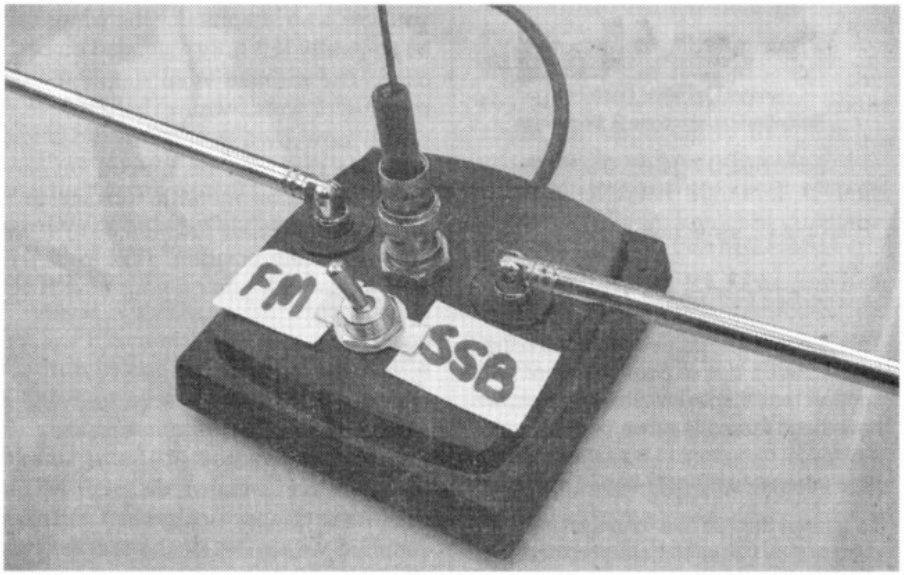


Figure 2: The IH-Vert-tenna showing the switch for converting from a dipole for SSB use to a vertical 'ground plane' antenna for FM use.

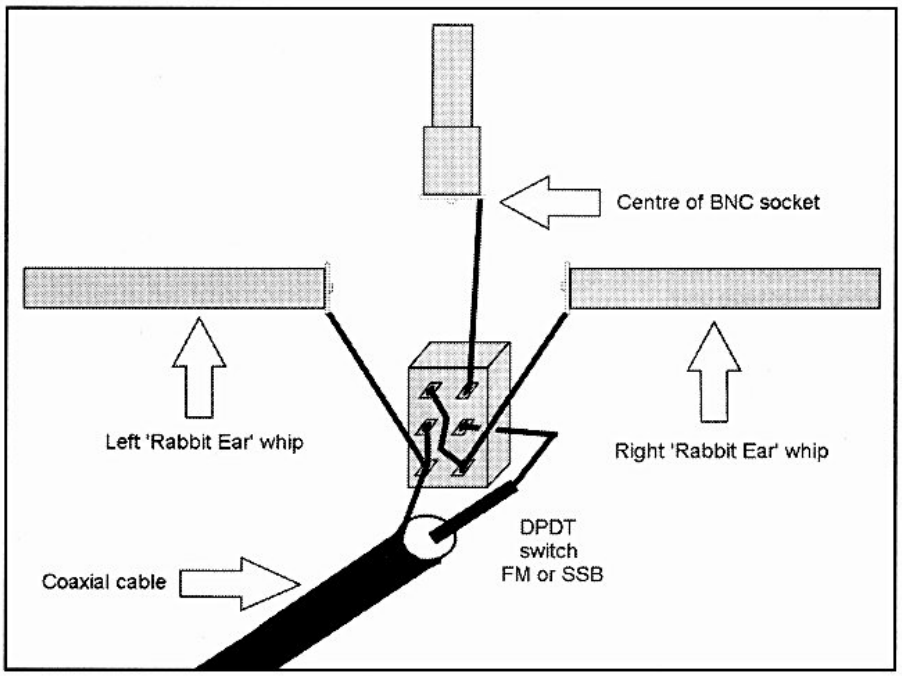
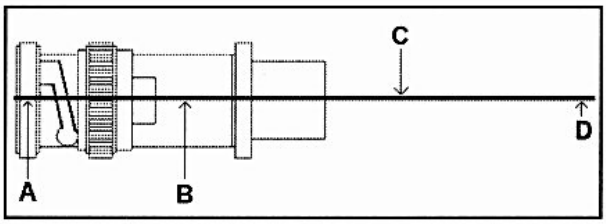


Figure 3: Construction technique and internal wiring to the DPDT switch.

Figure 4: Quarter wave whip construction.



A – The brazing rod comes right through the assembly taking the place of the pin that is usually in this position. Round the end with a file (rubbing the end on a concrete path does the same job!).

B – Insulate the rod through the body of the BNC and pack it out so that it doesn't move and lose contact with the antenna socket. A bit of round ball-point pen works well.

C – ¼ wave long on 6 m is approximately 1321 mm. ¼ wave long on 2 m is approximately 489 mm. And ¼ wave long on 70 cm is approximately 164 mm.

D – Loop the end over for safety or create a tip with a small piece of heat shrink tubing.

you are on air! In practice the whips can be generally left fully extended on each band. The tri-band whip supplied with the FT-817 works well.

You now own a versatile SSB/FM antenna that can be placed on any metallic or non metallic surface in a more advantageous location away from your operating position. Take your IH-Vert-tenna with you on your next BBQ in the park!

Enhancing your IH-Vert-tenna

Figure 4 shows how to build simple quarter wave antennas that will be far superior to the electrically short antennas supplied with most rigs. I use the cast off BNC 50 Ω terminations from old Ethernet computer systems, but a new BNC plug will work just as well.

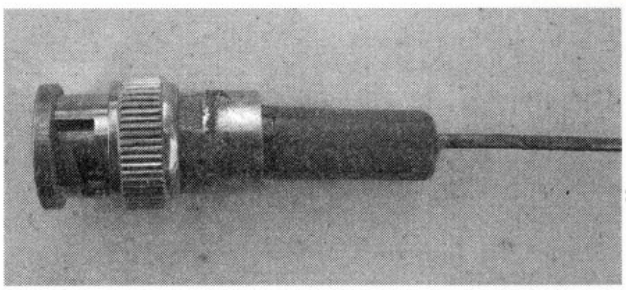


Figure 5: A close up of the quarter wave whip.

Brass 'brazing/welding' rods are sold in many tool shops - they are stiff, conductive and cheap! A 6 m whip will require you to solder some together if the rods you find are too short. Any *ARRL Antenna Handbook* from the 1980s onwards has a 2 m 5/8 wave antenna described that you can make which will work well on 2 m FM. (Editor's note: The 2 m 5/8 wave whip will also work as a loaded ¼ wave whip on 6 m – just be sure to check VSWR first.)

Forgotten your vertical? Simply mark the rabbit ear connected to the centre of the coax and swing it up vertically, the other whip will give you a reasonable 'ground plane' with the switch in the SSB position.

The model depicted has travelled to many locations and countries including portable operation in VK2/3/4/7,G, GM, EI, GW, F, HV, I, LX, DA, ON, OE, T7, EA, PA, VE, and 3A. I hope you, too, get some enjoyment, and a little more 'on air' time with this project.

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Figure 6: The author using the IH-Vert-tenna with an FT-897. (*EMR considerations would suggest that the antenna be placed at a greater distance from the operator and any other persons, especially if used with other than low power.* Ed.)

Owen VK3KI President of the WIA and Ewan McLeod VK4ERM Vice President of the WIA for a further year.

The Board also made the following appointments and reappointments:

Neil Penfold VK6NE National QSL Bureau Coordinator, Ken Matchett VK3TL National QSL Card Curator, Tony Hutchison VK5ZAI National ARISS Coordinator, David Wardlaw VK3ADW Standards Group Coordinator, with members John Bishop and Gilbert Hughes, Will McGhie VK6UU Historian, Chris Flak VK2QV National Bookshop Manager, Graham Ratcliffe VK5AGR National AMSAT Coordinator, Jack Bramham VK3WWW National ARDF Coordinator, Mal Johnson VK6LC National Awards Manager, Karl Hennig VK6XW National Intruder Watch Coordinator, Ewan McLeod VK4ERM National WICEN Coordinator, Ted Thrift VK2ARA National Club Coordinator and Phil Wait VK2DKN National BPL Taskforce Coordinator, with the BPL team comprising Keith Malcolm, Gilbert Hughes, Peter Young, Barry White, David Wardlaw, Justin Giles-Clarke and Owen Duffy (as an advisor).

Because of the terms of their existing appointments, the following appointments continued without further action by the Board:

Phil Smeaton VK2BAA National Contest Coordinator, Peter Mill VK3ZPP National Repeater and Beacon Coordinator, John Martin VK3KWA Chairman of the National Technical Advisory Committee, and the members of the NTAC Advisory Panel.

Other positions, such as the Editor of AR, are not made annually and those appointments are continuing.

ARISS Coordinator now also a WIA appointment

ARISS (Amateur Radio on the International Space Station) is a program sponsored by NASA, the ARRL, AMSAT Corporation and Verizon-MCI. The program gives students and young people the opportunity to speak via amateur radio to the crew on board the International Space Station as it circles the earth at 27,000 kph, 370 kilometres above the earth.

Tony Hutchison VK5ZAI has been the Australian coordinator for ARISS for some time, and after consultation with Tony, the WIA Board at its meeting immediately following the Annual General Meeting and Open Forum on 5 May 2007 at Parkes NSW, also made it a WIA appointment, appointing Tony WIA National ARISS Coordinator.

Already this year, following the highly successful contact with the Australian Jamboree at Elmore in January 2007, ARISS contacts have been made with schools in Sydney, Glenden in Queensland and Salt Creek in South Australia.

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Class-E AM/CW transmitter for 1.8 MHz

Drew Diamond VK3XU

The past few years have seen a marked increase in the use and popularity of "Top-Band" - 160 metres. Certainly, the long-running Melbourne "Coffee-Break" 11 am amplitude modulation (AM) session continues to grow. As a fraternity, AM fans are a friendly, technically-minded, "build-it-yourself" sort of crowd who also enjoy a good "chin-wag".

An AM transmitter may be constructed cheaply, using mainly re-cycled parts, by any reasonably handy amateur, yet produce an "on-air" signal that is as good as, perhaps better than, a commercial rig, and thus earn enormous personal and technical satisfaction from a job well done.

Unfortunately, for valve type transmitters, some components are becoming increasingly scarce - things like modulation transformers (although ordinary "mains" transformers can be pressed into service) and high-voltage transformers for instance.

My aim here was to build, using readily available components, an AM transmitter that produces an on-air signal of more than acceptable quality. For inspiration I trawled the "Class-E" web sites for data, and soon found the seminal QEX article (Reference 1) where Nathan Sokal outlined his findings.

For the prototype, AM and CW RF output power is nominally 25 to about 35 W. Best PA efficiency (93%) is obtained at 29 W output (for 31 W dc input power). All harmonics are at least 45 dB down on fundamental. The -6 dB modulation frequency response is 150 Hz and 4 kHz, rolling-off above about 5 kHz. The PA is not damaged by accidental short or open load, nor by operating into a high SWR for reasonable periods (eg during antenna coupler adjustments).

Photo 1 – The completed transmitter.

Class-E Amplifier

Experimenters have achieved acceptable results using ordinary switching MOSFETs as class A, B, C and D RF power amplifiers (Reference 2). The limiting factor with these devices is the effect of their rather high input and output capacitances as the operating frequency is raised. Efficiency decreases as a function of the time period that the drain voltage/current wave-forms overlap, their instantaneous product being dissipated (wasted) power.

In a class-E amplifier, the FET operates essentially as an on/off switch. The L/C output network shapes, and times, the voltage and current wave-forms such that high voltage/high current values do not occur simultaneously, thus significantly reducing device power dissipation. Efficiencies in excess of 90% are easily achievable.

A typical class-E amplifier is shown schematically in Fig 1. Let's have a look at what (I think) happens during one complete radio-frequency cycle.

The FET gate is driven with a square-wave of sufficient amplitude to cause the drain-source resistance to alternate at signal frequency between a very low value (typically less than 2 ohms) and a very high value.

A current source is provided through drain choke coil L1. Its value is not critical, but should have a reactance of about 20 or 30 times the load resistance (Reference 1).

Capacitance C1 is comprised of the intrinsic drain-source capacitance of the FET and an additional fixed capacitor. The cycle begins as the FET is switched off. Energy stored in the magnetic field of L1 sources current into C1, which begins to charge. As the voltage across C1 rises, current flows into series tank L2-C2, loading capacitor C3 and the parallel load RL. After one half-cycle, C1 is discharged.

As the FET is switched on, energy stored in the tank L2-C2 now causes a current to flow in the opposite direction, through the load and the low "on" resistance of the FET, at the same time drawing current from the voltage supply through L1, which stores a new charge

in its magnetic field, thus completing the second half-cycle.

It should be noted that L2-C2 is not an exactly resonant tank. It functions as a "fly-back" circuit to generate a correctly timed voltage of about four times Vcc at the drain. Photo 2 shows the drain voltage wave-form coincident with gate input signal.

Interestingly, the voltage wave-form at the load is almost sinusoidal. However, the second harmonic is only about 20 dB down, so additional filtering is required for an amateur transmitting amplifier application.

A class-E amplifier is only suitable for use as a modulated stage in an AM transmitter (for which it is excellent), amplification of CW (telegraphy), and FM signals. For a complete graphical and mathematical analysis, the curious are pointed to References 1 and 3.

Circuit

1.843 MHz is a very popular frequency for daytime AM operation around Melbourne, and is also a favourite spot for night-time inter-state working. Fortunately, 1.8432 MHz crystals are cheap and readily obtainable. Therefore, our circuit may be greatly simplified in this instance by employing crystal control.

A classic oscillator-buffer-driver-PA is employed. Beginning at the top-left in Fig 2, a sure-fire Colpitts circuit excites the crystal using a 2N5484 FET. Some frequency adjustment is afforded by the 300 pF variable capacitor in series with the crystal.

The oscillator signal is presented to one input of a 74HC04 hex inverter chip, the remaining five inverters are parallel-connected (to increase drive capability), and thence to the gate of the class-E output amplifier. A small amount of forward bias (about 3.5 V dc) is applied to the MOSFET gate to improve sensitivity, such that a 6 V p-p signal (from the 74HC04) fully drives the PA.

Much experimental effort was spent in finding the most suitable, economical power MOSFET. A collection of various likely-looking devices were tried. Some parameters were found by study - others by trial and error. The selected device must have low input, output and transfer capacitances, reasonably fast switching speed, a voltage rating at least eight times Vcc, drain current twice expected

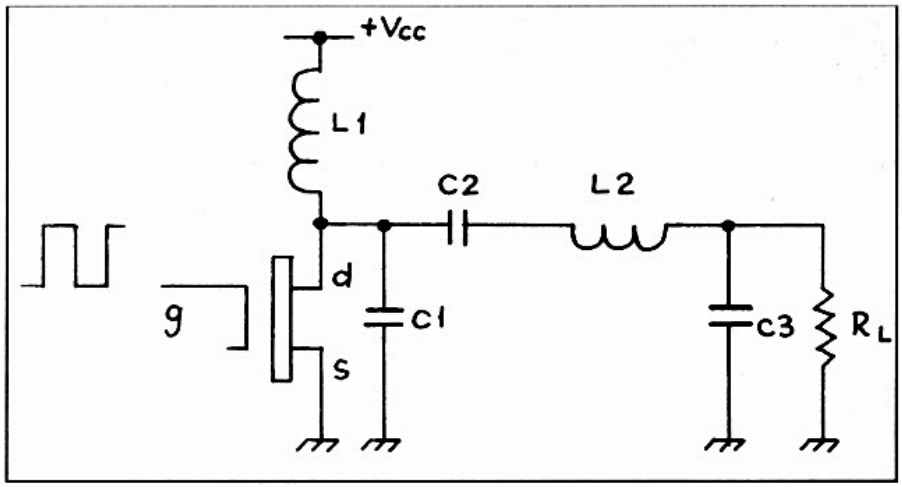

Fig 1 - A typical class-E amplifier.

(2 x 1 A), and low turn-on resistance (less than 2 ohms). The Siemens type BUZ90A device was found to work very well indeed. Salient specifications are: - Vds: 600 V; Id: 4 A; Rds (on) 2 ohms; power dissipation: 75 W; cost: about $2.

Values of L and C in the amplifier output network were first calculated, and then varied empirically for best efficiency. Tuning capacitor C2 and loading capacitor C3 are adjustable compression mica types. An efficient, effective low-pass filter (Reference 4) follows the amplifier output to reduce harmonics to an acceptable level.

High-level amplitude modulation is applied to the drain of the PA. A well tried and tested Silicon Chip modular audio amplifier (available in kit form) provides the large signal necessary to "swing" the PA supply voltage between 0 and twice Vcc (about 60 V p-p). The 30 V ac "secondary" of an ordinary power transformer T2 is used as an auto transformer to affect a good match (using the 27.5 V tap) between the modulator and PA, these being coupled through a 2200 µF capacitor.

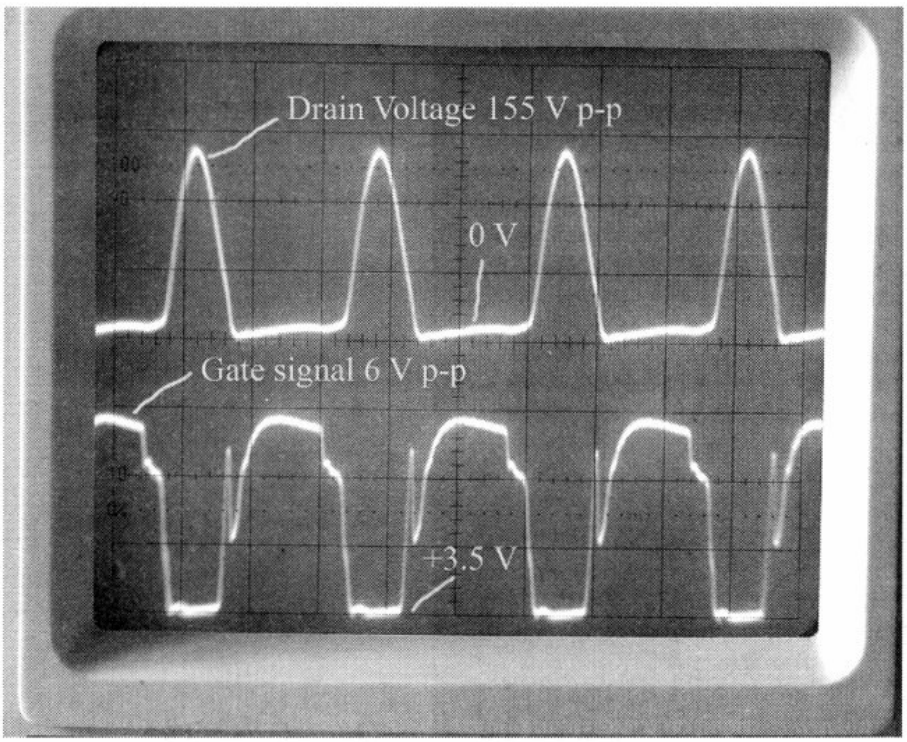

Photo 2 - The drain voltage wave-form coincident with gate input signal with the CRO set a sweep speed of 0.2 µS per division.

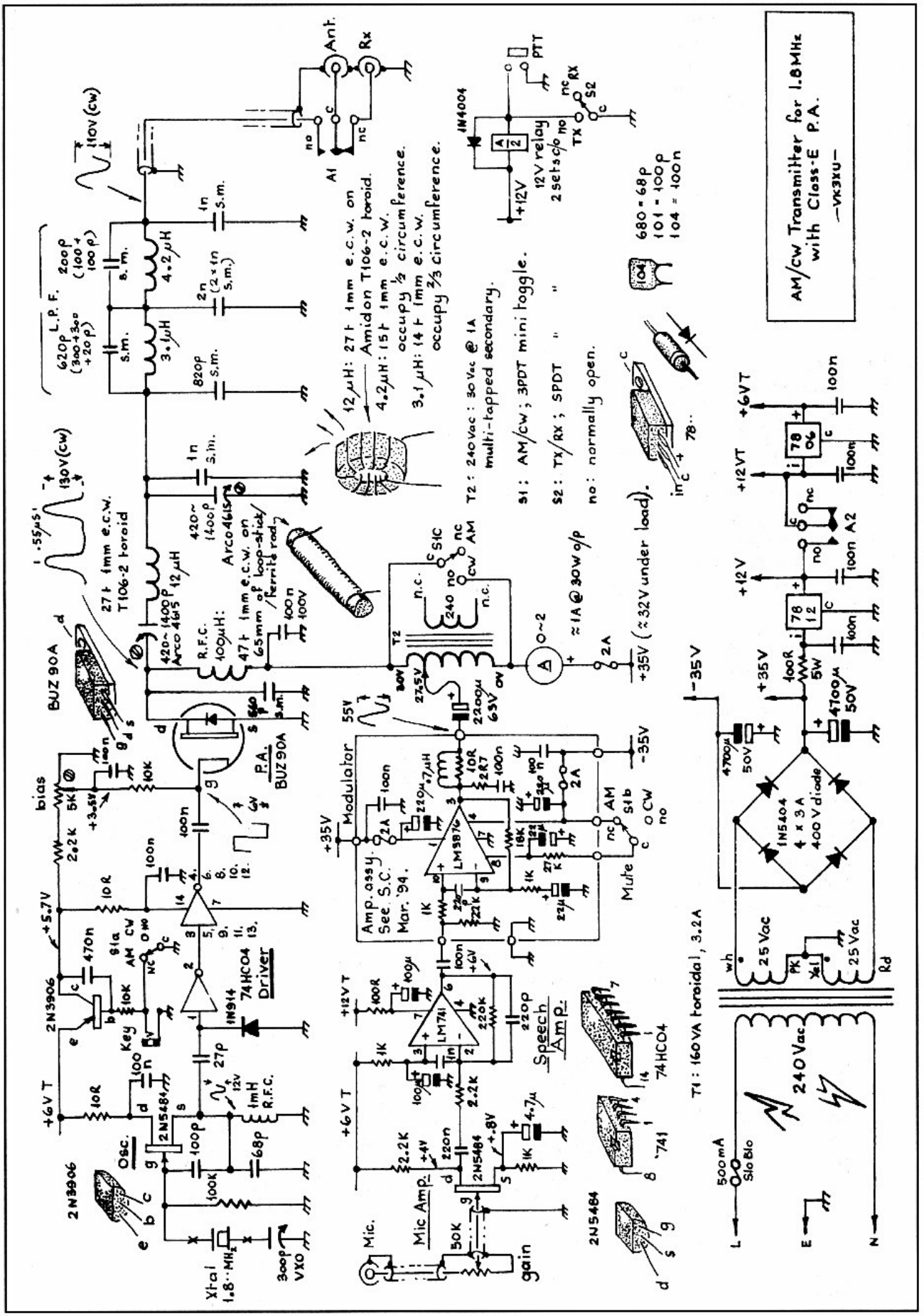

Fig 2 – Schematic of the AM/CW transmitter for 1.8 MHz with a Class-E PA.

In CW Morse mode, the modulator is muted, and the +6 V dc driver/bias supply is ramped up and down in response to the key through a series 2N3906 PNP transistor. Rise and fall times are about 5 ms for crisp click-free keying.

Unregulated +35 and -35 V dc rails for the modulator are provided by a conventional bridge rectifier and filter capacitor circuit, powered by a centre-tapped 50 V ac (25-0-25) winding on transformer T1. Regulated +12 and +6 V dc are operated from the +35 V dc supply, which also powers the PA (when delivering 30 W RF, the +35 rail falls to about +32 V dc under load).

Construction

The home-made aluminium box/chassis pictured in Photo 1 measures 75 x 260 x 225 mm HWD. The bottom chassis panel functions as a heat-sink for the LM3876 modulator chip and the BUZ90A MOSFET (both devices run very cool).

The RF circuit, microphone/speech amplifier and power supply are each accommodated upon "paddyboard" style (Reference 5) circuit boards. Suggested layouts are shown in Fig 3. However, any preferred construction style will serve, provided that signal carrying component leads (eg coupling and by-pass capacitors, etc) are reasonably short, and that the general plan illustrated in Photo 3 is followed.

A rectangular hole of 12 x 18 mm should be provided in the RF board so that the BUZ90A may be attached directly to the bottom panel. Include a silicone washer and the usual hardware. A solder tag is mounted under the 3 mm hex fixing nut for the drain connection.

The LM3876 is similarly attached (silicone washer again) to the bottom panel as shown in Photo 3. Build the audio power amplifier (modulator) in accordance with the instructions provided with the kit.

The LM741 for the speech amp, and the 74HC04 chip, may be fitted into appropriate IC sockets which, in turn, are soldered to suitably sized pieces of Veroboard. Remember to first cut a shallow slot (junior hack-saw) along their length to separate the pins each side of the Vero "substrate". Avoid poking the socket pins right through (so as not to short to the board foil). These are super-glued (sparingly - no glue must get on the items that take solder!) to their respective circuit boards as shown.

The drain choke coil is 47 turns of 1 mm (#18 B&S) ecw wound upon a 65 mm (approx) length of ordinary 9 mm diameter ferrite rod/loop-stick material. The start and finish of the winding may be secured with a cable-tie fitted over the winding at each end.

All wiring on the 240 V ac mains side of transformer T1 MUST be suitably covered to prevent accidental contact. Include a 500 mA "slow-blow" fuse as shown.

Operation

Carefully inspect your wiring and soldering for quality and accuracy. Double check for correct polarity of all polarised devices such as ICs, electros, diodes, regulators, transistor, and FETs, etc.

It would be prudent to first verify the supply rails. Remove the 2 A fuses from the modulator amplifier board and the 2 A PA fuse from the power supply board. Apply mains power and check that you have (about) +35, -35 and +12 V dc where indicated. Close the PTT line and note that the antenna change-over relay A pulls in, whereupon you can measure the +6 V dc supply.

Install a crystal. If an oscilloscope is available, select AM mode, close the PTT line and observe the signal at the gate of the BUZ90. You should see a raggedy square-wave of about 6 V p-p (lower trace - see Photo 2). Adjust the bias pot (initially) for about +3.5 V on the slider. Some salient signal and dc voltages are shown on the circuit to aid in any necessary trouble-shooting.

Replace the fuses. Connect a suitably rated 50 ohm dummy load/power meter to the output. Also hook your probe/oscilloscope to the output connector. Remove the crystal, and then close the PTT line. Adjust the bias pot for just a few mA standing PA current. Re-install the crystal, thus driving the PA. Current should rise to 1 or 1.4 A, and some power output should be indicated. Adjust the series tuning and load compression capacitors for maximum indicated output, which should be 30 to 35 W. If you want maximum efficiency, increase the capacity (clockwise) of the series

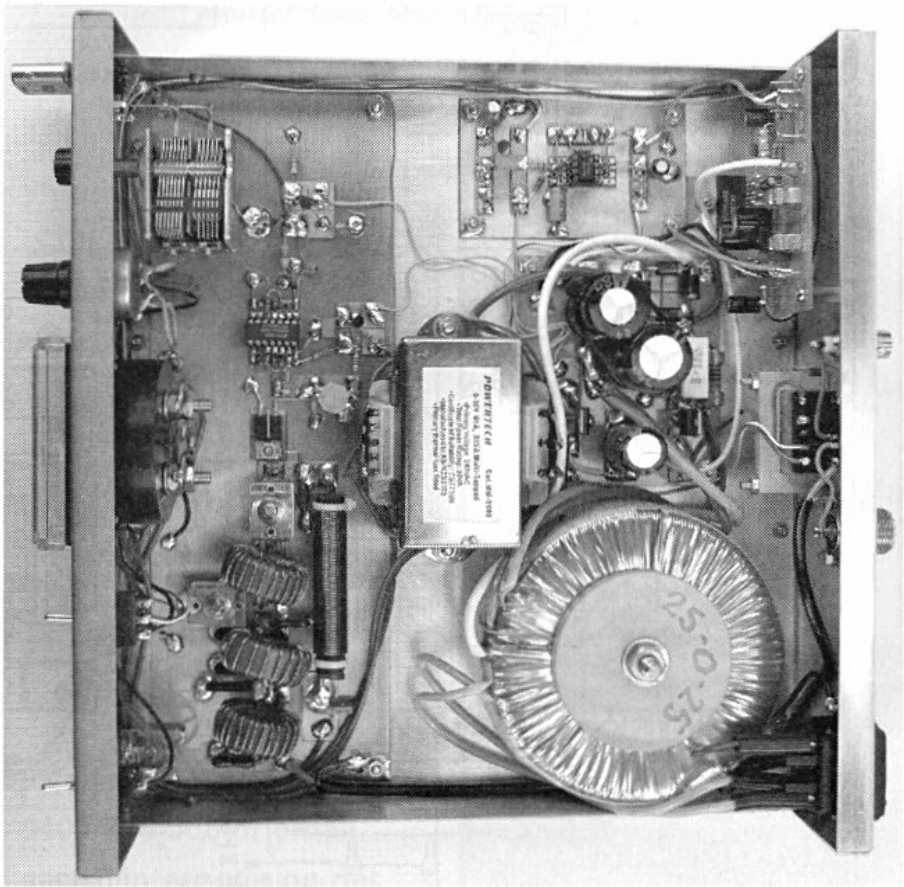

Photo 3 – A top view of the transmitter with the case removed.

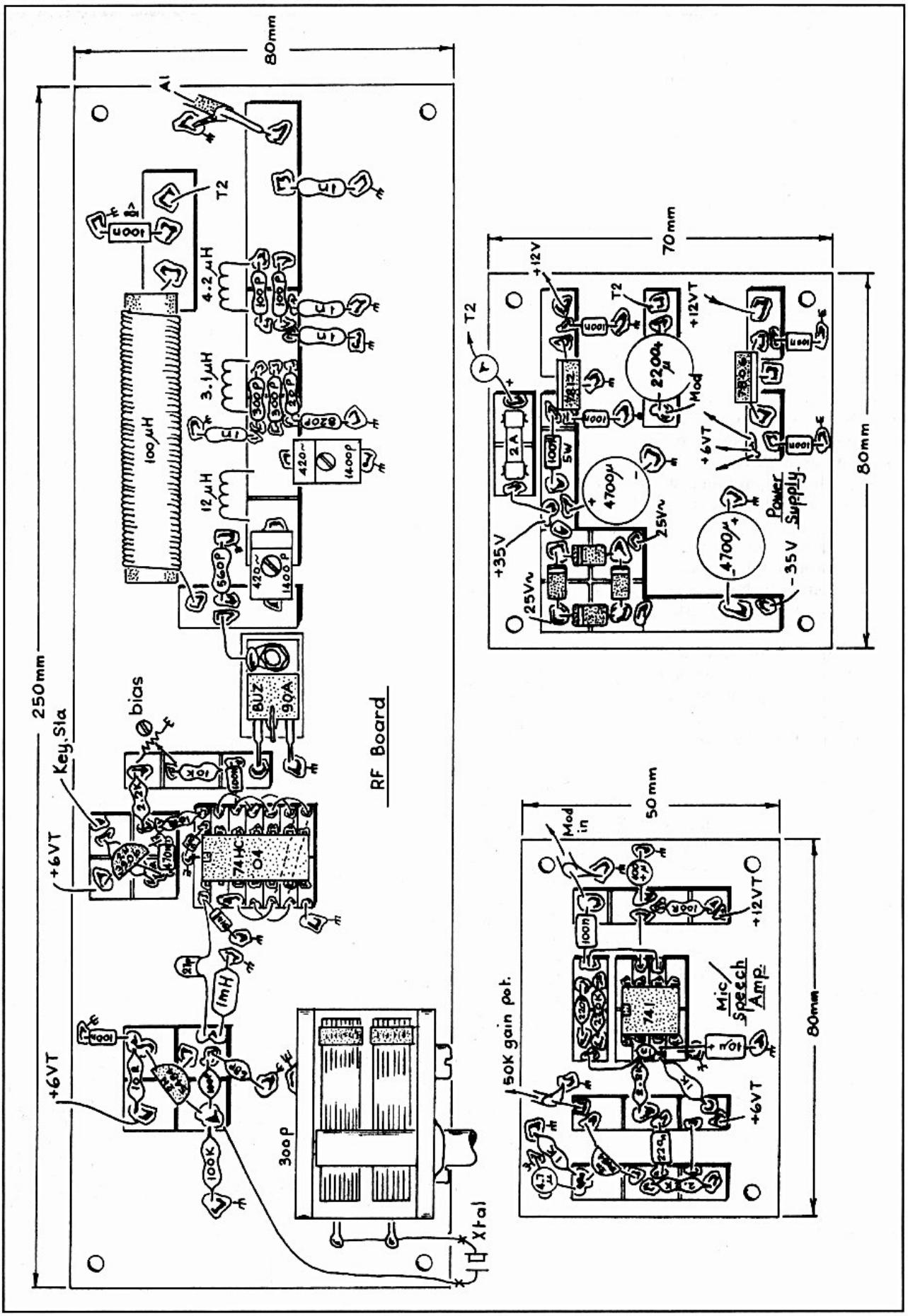

Fig 3 – Layout of the circuit boards and components for the AM/CW transmitter for 1.8 MHz with a Class-E PA.

tuning capacitor for about 1 A drain current, or about 29 W output.

With the 'scope time-base at (say) 0.2 µS/division, observe a clean sine-wave output signal.

Connect a suitable microphone. Advance the microphone gain and observe a typical AM modulation envelope upon the 'scope. A percentage modulation meter is not essential, as it will be found in practice that 100% modulation is indicated by a slight downward flick of the PA drain current meter.

Verify CW mode by keying the transmitter. You should see a nicely ramped keyed wave-shape on the 'scope (in CW mode, you may notice a smidgen of 100 Hz ripple, which is quite acceptable). In AM mode, the compliance/low impedance of the modulator amplifier acts like a shunt regulator, so there is very little ripple on AM.

Parts

All of the ordinary components are available from our usual electronics suppliers, including Altronics, Electronic World and Jaycar. The toroidal mains transformer may be a Jaycar MT 2114. The "modulation" transformer is an MM 2008, although any generic, multi-tapped 30 V ac/1 A transformer should serve.

The Silicon Chip audio amplifier for the modulator may be a Jaycar kit KC 5150, or an Altronics K 5114. To effectively increase "talk-power", a suggested worthwhile later addition to the transmitter is a "Microphone Audio Compressor Kit", a Silicon Chip project available as an Altronics K 5525.

Capacitors marked "100 n" (outside the modulator) are 50 V monolithic types, except that at the +35 (32) V dc end of the 100 µH choke, which should be a 100 n/100 V MKT polyester RM 7125.

For best efficiency, the fixed capacitors in the output L/C network and filter should be 500 V silver mica types. These, and the 420-1400 pF compression trimmers (P/N TC-4615), were mail-ordered from Ocean State Electronics (http://www.oselectronics.com). Antique Electronic Supply can also deliver silver micas (www.tubesandmore.com).

My Siemens BUZ90A MOSFETs were purchased from Rockby Electronics (http://www.rockby.com.au/). Their part number is 12329 and they cost about $2 each (plus freight, etc).

Crystals for 1.8432 MHz (flying leads) may be obtained from Electronic World (03 9723 3860), Rockby, or mail ordered from Surplus Sales of Nebraska (http://www.surplussales.com) with a part number CRY-001843200.

The three Amidon T106-2 toroids may be ordered from any of the suppliers regularly listed in the Hamads section of Amateur Radio.

References and Further Reading

1. "Class-E RF Power Amplifiers"; N Sokal, WA1HQC, QEX, Jan - Feb 2001.
2. Experimental Methods in RF Design; W Hayward et al.; ARRL, pp 2.31, 2.32.
3. "High Efficiency Class-E Power Amplifiers"; D Rutledge et al.; QST, May - June 1997.
4. "Low-pass filters for solid-state linear amplifiers"; K Shubert WA0JYK, Ham Radio, March 1974.
5. ""Paddyboard" Circuit Construction - Revised"; Amateur Radio, May 2005.

Photos: Andrew Diamond (www.andrew-diamond.net).

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A visit to the shack of Glenn VK4TZL

Ray Elliott VK4BLK

The photos provide a glimpse of the shack, and antenna farm, of Glenn McNeil VK4TZL, who resides in the coastal town of Torquay, south of Bundaberg, in Queensland.

Glenn is a builder and assembler of equipment, and the photos give some support to the view that he is rather better than most at these endeavours.

First, the shack (see Photo 1).

On the top shelf, far left, is a 3.5 kV power supply that provides EHT to the 2 amplifier decks to its right. The first of the decks is a GS35B on 144 MHz, and the second the same tube on 432 MHz.

Below the amplifiers is an old 400 MHz Pentium computer that is used for the Internet, and also runs various other programs, all over serial connections, hence the age of the machine.

On the desk, partly hidden by the desk microphone, are 2 Elecraft K2's, one a 100 W unit for HF, and the other a 10 W unit that is used solely as an IF for the 50/144/432/1296 MHz bands.

Above the K2 transceivers are 3 Elecraft transverters, for 50/144/432 MHz, and a Kuhne TR1296 transverter, for 1296 MHz.

In the rack on the right, from the top, is a fixed channel FM 2 meter transceiver, the EHT

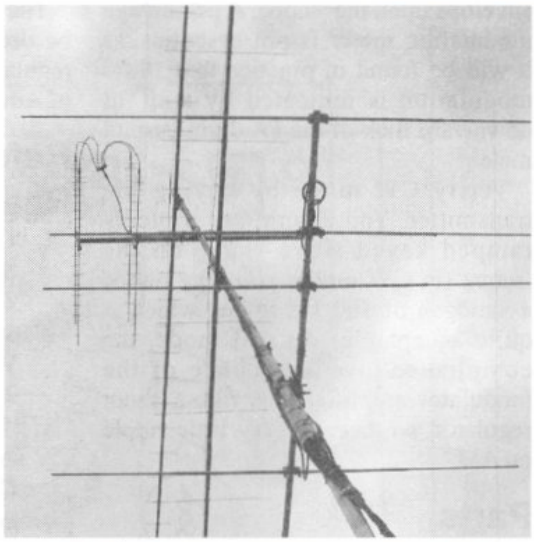

Photo 2:The antennas viewed from below.

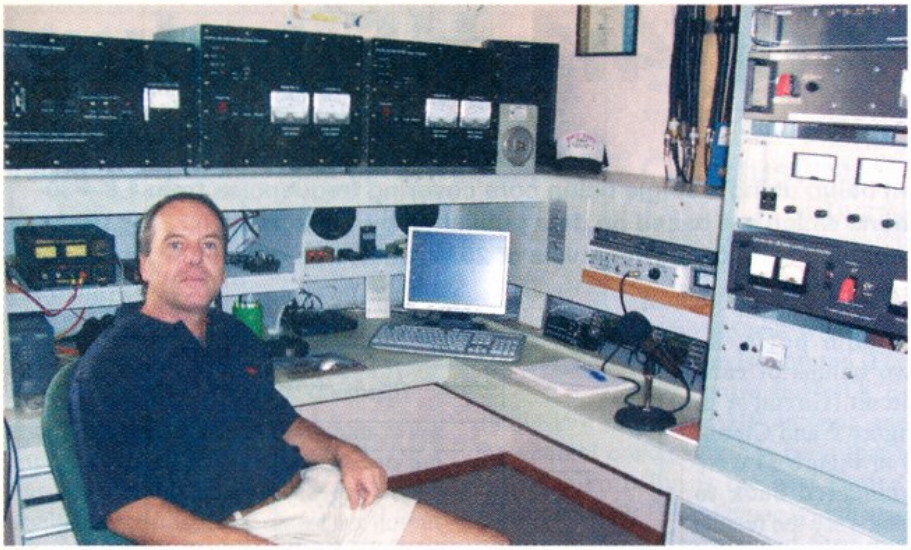

Photo 1: Glenn in his well organised shack.

supply for the 1296 MHz amplifier, and HP 13.8 V power supply that powers all of the solid state gear, and under it is a GS15B water-cooled 1296 MHz amplifier, with its water cooling system sitting on the desktop.

Various other pieces of equipment complement this equipment, rounding off a very impressive, home built/ assembled station.

Outside, the antenna set-up is also impressive.

There are 4 by 20 elements on 1296 MHz, 37 elements on 432 MHz, 17 elements on 144 MHz, and shortly 5 elements on 50 MHz. A small 4 element vertical Yagi is used on 144 MHz FM. And all of that sits somewhere on a 10 metre tilt-over mast. Finally, a 3 m dish awaits completion for 1296 MHz.

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Photo 3: A work in progress – the dish for 23 cm (keeping one of the locals happy).

Plan ahead

Up-coming Hamfests **– Cranbourne,** 22 July; **Perth,** 6th August; **Shepparton,** 10th September; **Ballarat,** 4th November

A high power 4:1 HF balun

Ron Sanders VK2WB

This article describes a 4:1 (200:50 ohm) balun using a single balun core covering frequencies from 1.8 – 30 MHz at 600 W. There are two configurations which are based on data published by Chris Trask N7ZWY (Ref.1). He used a small balun core which is probably useful for power levels of 20 W, but it was decided to try a larger core to see what power could be achieved.

Construction

The core is Amidon type BN-43-7051 (Ref.2), which has the dimensions shown in Figure 1.

Two circuits from Trask were constructed to see if there were any differences in operation. Circuit A in Figure 2 is said to be suitable for a 4:1 balun where there is a balanced load (no ground reference) such as a dipole, while Circuit B in Figure 3 is suitable for any type of load whether balanced or not.

The windings consist of two transmission lines (T_1 and T_2). Dots indicate the start of each winding to enable correct phasing when connecting the windings. Transmission line theory says that the characteristic impedance (Zo) of the line used in a transformer should be close to √(Zin*Zout). In our case this is √(50*200), which is 100 ohms.

Since I wanted to operate the balun at high power, it was necessary to choose suitable insulation for the wire forming the transmission lines. When operating at 1000 W, a 200:50 transformer can have 1250 V p-p across the high impedance winding. From previous experiments, I knew that some 18 g copper with PTFE insulation had a Zo = 95 ohms when formed into a twin transmission line, so it was decided to use a pair of these wires for each transmission line (Ref 3).

Trask used two turns for each transmission line, which meant that eight individual wires passed through each hole in the core. This proved to be the maximum allowable in a 6.35 mm diameter hole. The input and output are at the same end of the core, which reduces the amount of wire outside the core when the windings are connected. This is good for the high frequency response of the balun. The wound balun is shown in Photo 1.

Tests

Initial tests were carried out at low level (0 dBm) with a Ten-Tec Vector Network Analyzer. The VNA requires 50 ohm ports, so two baluns of each circuit (Circuit A in Figure 2 and Circuit B in Figure 3) were connected back to back – see the results in Figure 3a and Figure 3b. It was assumed that each balun contributed half of the total loss, and each balun had an SWR better than the combination. HF band limits are indicated by the arrow markers.

The above tests show that from 1 - 35 MHz, the combined baluns have very little loss and have an SWR less than 1.5. Figure 3a shows that Circuit A in Figure 2 has a lower SWR at the low frequency end, but a peak near the high end, whereas Circuit B in Figure 3b falls fairly consistently from the low end to the high end. Don't forget that these plots are for two baluns in combination rather than a single balun.

To complete the tests it was necessary to try the baluns with high power at 3.5 and 29 MHz. The idea is to see how warm the baluns get after 30 seconds of continuous output at various power levels. Since I could only operate at 100 W, I contacted a ham who lives locally and can operate all bands from 3.5 to 29.7 MHz at any power up to 1000 W. His linear amplifier has instrumentation showing RF power and SWR and has complete protection from adverse

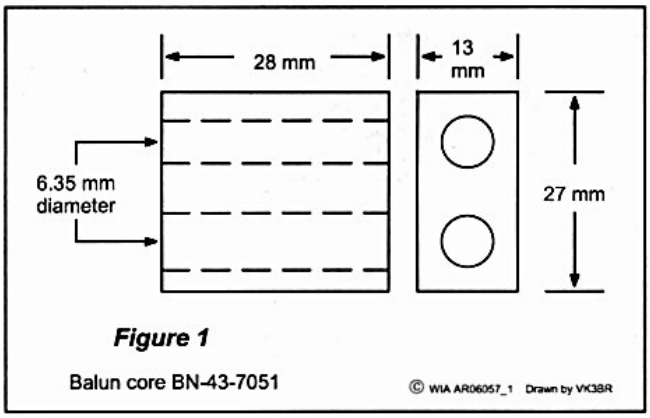

Figure 1: Balun core BN-43-7051.

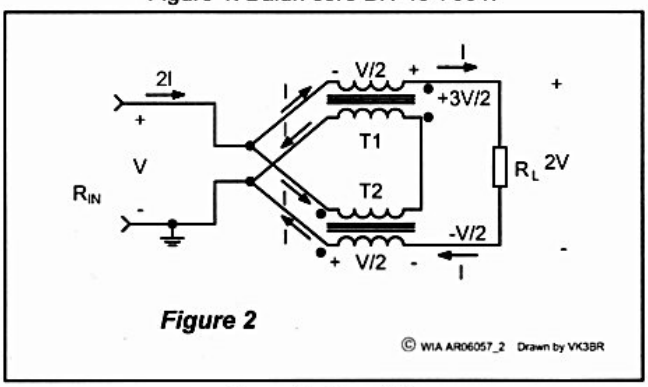

Figure 2: Circuit A.

Circuit	Frequency MHz	Power W	Results
A	3.5	100	no warmth detected
		500	just noticeable warmth
		800	quite warm
	29	100	no warmth detected
		500	just noticeable warmth
		800	very warm but touchable
B	3.5	100	no warmth detected
		500	just noticeable warmth
		800	quite warm
	29	100	no warmth detected
		500	just noticeable warmth
		800	very warm but touchable

Table 1

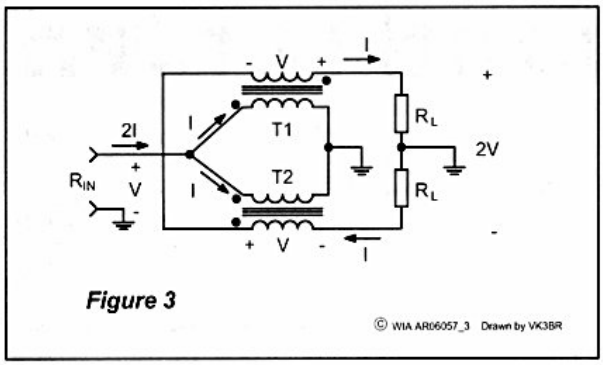

Figure 3

Figure 3: Circuit B.

operating conditions. The baluns were connected back to back (as used in the low level tests) so that they could be easily inserted in the 50 ohm coax output from the linear amplifier. The results are shown in Table 1 and the two baluns in each combination produced the same results as listed.

The results indicate that 800 W is too high, as high temperature can change the ferrite characteristics and cause complete failure, so it was decided that 600 W would be a safe level for operation. It has been assumed that operation at 1.8 MHz would not cause a problem with the same power. There were no signs of voltage breakdown in the windings.

Conclusion

There is always considerable discussion on the internet about feeding various balanced antennae and what type of balun is required. The "off centre fed" (OCF) dipole is a multiband HF antenna and the general conclusion has been that a 50:200 ohm balun is the best choice. There are other HF antennae which also require a 200 ohm balanced feed and this balun can provide a compact high power solution.

The low level tests provided real (measurable) data on loss and SWR which were reflected in my unsophisticated 'feel' temperature tests at high power.

The arrangement of Circuit B is referred to as an 'improved balun' by Trask due to its unrestricted type of load. From my tests it is also the preferred arrangement, although either circuit is acceptable with the load restrictions listed.

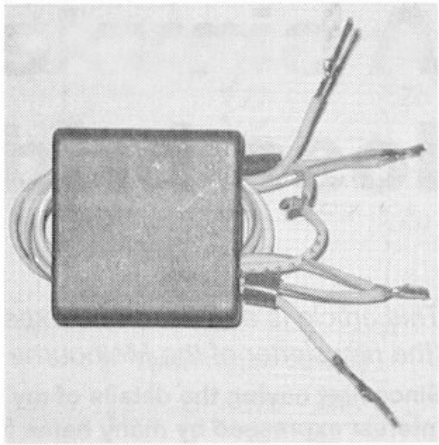

Photo 1: The wound balun.

References

1 www.home.earthlink.net/~christrask
2 www.catchnet.com.au/~rjandusimports
3 www.magcore.com.au

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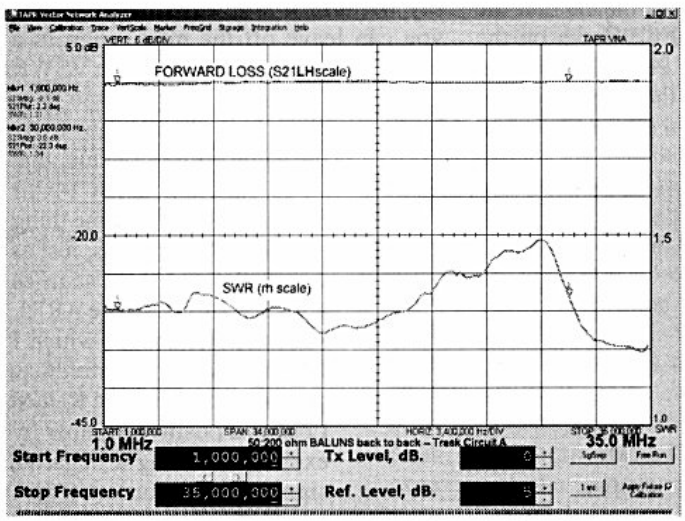

Figure 3a: Circuit A, showing a lower SWR at the low frequency end, and a peak near the high frequency end.

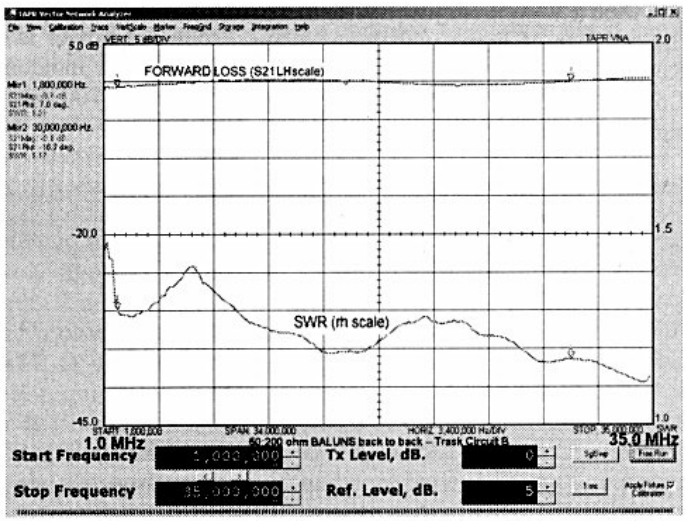

Figure 3b: Circuit B, showing the SWR falling fairly consistently from the low frequency end to the high frequency end.

WIA Comment *continued*

So, what can we conclude from all of this?

I suggest the evidence is very strong that the new entry level licence is doing what is was meant to do, that is attracting new entrants to amateur radio.

There is some evidence that an acceptable number of these new entrants are seeking to upgrade their licence.

So far as WIA membership is concerned, I think it is obvious that the increased amateur population has assisted membership growth, but I would like to think there are other factors also affecting the growth in membership.

I hope that one reason is that the WIA is seen as an organisation that is open and active, providing information on what it is doing and providing a friendly and helpful service, particularly through the office.

But I also hope that more and more amateurs are recognising the importance of the WIA's advocacy role, for example providing a reasoned and effective voice on issues such as BPL, and as an ongoing advocate on regulatory matters, both nationally and, in this year of an ITU World Radiocommunication Conference, internationally as a serious participant in the ongoing process of international spectrum allocation and regulation.

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A simple wideband return loss bridge revisited

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This article is a revised and expanded version of a shorter article originally published in NERG News, (the newsletter of the Melbourne North East Radio Group), December 2005.

Since first having the details of my Return Loss Bridge published in NERG News, I have had quite a bit of interest expressed by many hams for more information and/or some follow up on the uses for such a device.

I know for some people including too much of the theory can be a turn off, however some people really want to see these sorts of things (and I am one of them), so if you just want to get down to the construction bits I suggest you skip ahead a couple of sections.

What is Return Loss and what has it got to do with a Bridge?

While most hams have heard of VSWR, and used a VSWR (or just SWR) meter, the number of hams who know what Return Loss is or have used a Return Loss Bridge (or RLB for short) is surprisingly small. Surprising, because a RLB is a very simple but powerful tool that can be at least as useful as a VSWR meter. Do not be confused by the bridge bit of the name, a VSWR meter is also often referred to as a VSWR Bridge, a Return Loss Bridge is just a tool for measuring Return Loss.

Put very simply, Return Loss gives a relative measure of the amount of power returned (or reflected and "lost") from a load, to that power offered forward to, or incident on, that load. Return Loss is usually measured in dB and for example a Return Loss of 20 dB means that the reflected power is 20 dB down on the total power incident, i.e. if the forward power was 100 Watts, the reflected power would be 1 Watt. So a return loss of 20 dB indicates a reasonably good match. For those that want to think in terms of VSWR, a 20 dB return loss is equivalent to about a 1.2:1 VSWR., suffice to say the bigger the value of the Return Loss, the better is the match, and the less power is being "lost" to reflections.

Note there is some potential confusion about the use of a sign on the Return Loss: some say it should always be negative because the reflected power is always less than the forward power and so you should show the sign, and others say because it is always negative that you can leave off the minus sign in a similar way that the ratio bit of a VSWR is often neglected. Others define it as being positive. It is always, however, the same absolute value, that is, in common use a 14 dB Return Loss is the same thing as -14dB Return Loss, just as a VSWR of 1.5 is the same as a VSWR of 1.5:1. The ARRL Antenna Handbook, which I take as a standard reference, goes so far as to force Return Loss as a positive number by explicitly putting a negative sign in the equation for it, just so that it will cancel out. They do at least mention that some people define it as a negative. As an example of this, the Belden Company, of coax cable fame, subscribes to the "show the negative" school. The important thing to remember is no matter who is saying it, that the reflected wave is always less than the forward wave by an amount equal to the number part of the Return Loss.

For the purposes of this article, I will stick with the

Refl Coeff	Return Loss (dB)	VSWR	Equiv Resistive Load (50 Ohm system)		Refl Coeff	Return Loss (dB)	VSWR	Equiv Resistive Load (50 Ohm system)	
1.00	0	Infinity	Open	Short	0.09	21	1.20	59.79	41.82
0.89	1	17.39	869.55	2.88	0.08	22	1.17	58.63	42.64
0.79	2	8.72	436.21	5.73	0.07	23	1.15	57.62	43.39
0.71	3	5.85	292.40	8.55	0.06	24	1.14	56.73	44.07
0.63	4	4.42	220.97	11.31	0.06	25	1.12	55.96	44.68
0.56	5	3.57	178.49	14.01	0.05	26	1.11	55.28	45.23
0.50	6	3.01	150.48	16.61	0.05	27	1.09	54.68	45.72
0.45	7	2.62	130.73	19.12	0.04	28	1.08	54.15	46.17
0.40	8	2.32	116.14	21.53	0.04	29	1.07	53.68	46.57
0.36	9	2.10	104.99	23.81	0.03	30	1.07	53.27	46.94
0.32	10	1.93	96.25	25.98	0.03	31	1.06	52.90	47.26
0.28	11	1.79	89.24	28.01	0.03	32	1.05	52.58	47.55
0.25	12	1.67	83.55	29.92	0.02	33	1.05	52.29	47.81
0.22	13	1.58	78.85	31.71	0.02	34	1.04	52.04	48.04
0.20	14	1.50	74.93	33.37	0.02	35	1.04	51.81	48.25
0.18	15	1.43	71.63	34.90	0.02	36	1.03	51.61	48.44
0.16	16	1.38	68.83	36.32	0.01	37	1.03	51.43	48.61
0.14	17	1.33	66.45	37.62	0.01	38	1.03	51.28	48.76
0.13	18	1.29	64.40	38.82	0.01	39	1.02	51.14	48.89
0.11	19	1.25	62.64	39.91	0.01	40	1.02	51.01	49.01
0.10	20	1.22	61.11	40.91	0.00	Infinity	1.00	50.00	50.00

Table 1: Reflection Coefficient, Return Loss, VSWR, and Resistive load Equivalences

ARRL version, which has a minus sign in the Return Loss equation, but not in the numbers it produces.

Table 1 illustrates the relationship between Return Loss and VSWR. I have also included the reflection co-efficient and the equivalent load pure resistance values that would apply.

All the relevant formulae for calculating these quantities can be readily found either on the web or in places like references 2 and 3. The only important ones we need here now are the simple ones:

$$RL = -20 \times Log|\rho|$$

and

$$|\rho| = \frac{|Zo - Zu|}{|Zo + Zu|}$$

Where

ρ = Reflection co-efficient, and

|ρ| = the magnitude of the reflection co-efficient

RL = Return Loss in dB

Zo = The reference impedance, or that of the transmission line, in ohms typically 50 Ω.

Zu = The unknown impedance in ohms

The straight line brackets in the above indicate that the reflection co-efficient and the various impedance terms are actually vector or complex quantities that have both a magnitude and a phase. For our purposes, because Return Loss is not a vector quantity, we only need to worry about the magnitudes, which is just as well as they are the simplest to understand and measure. From here in this article, unless otherwise stated, assume that when I mention the reflection co-efficient, it refers to the magnitude only.

Return Loss bridge basics and the importance of being balanced

The Return Loss bridge presented here is based on the classic bridge circuit shown in Figure 1. If you look at Figure 1a, the ideal case, it is relatively easy to see that if the top two impedances marked Zo are equal, then the voltage Vr will equal zero or null when Zu is equal to Zo. Usually the impedances Zo are all equal to the characteristic impedance of your transmission line (typically 50 Ω in the ham coax case), and Zu is connected by a bit of transmission line. You can see that this null will occur when the load, say an antenna, is also equal in impedance to this value. A bit of maths can take this further still and show that in fact in this case, that the voltage Vr is equal to the reflection co-efficient multiplied by a constant value. If we measure this voltage in a logarithmic way (that is, in dB), then the difference between this value, with a particular value of Zu, and the value with a known reflection co-efficient (typically open or short where reflection co-efficient is one), the constants will cancel out and the resultant will be the value of Return Loss in dB for that Zu.

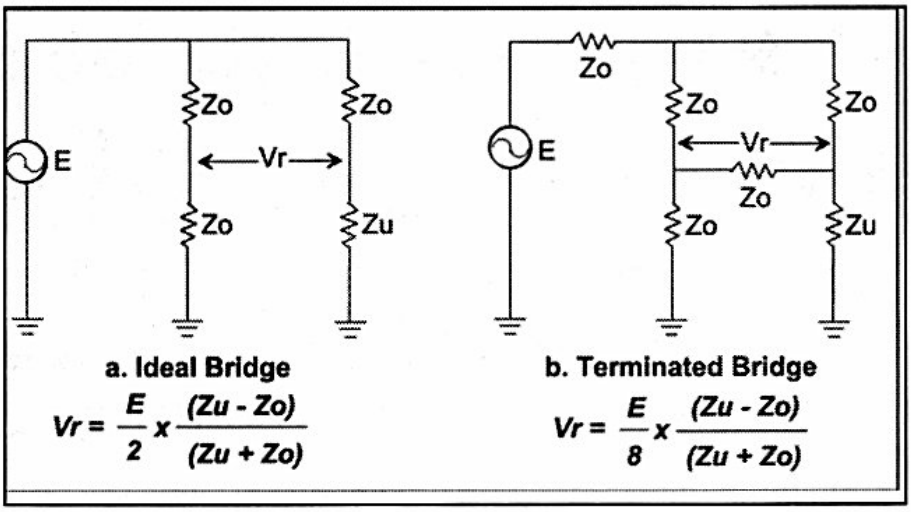


Figure 1: Basic bridge circuits

Many simple SWR meter and RLB designs are based on this ideal Figure 1a circuit, often using a diode detector to measure Vr. The problem with this ideal circuit is that it is very difficult to provide the ideal required add-ons, that is, the detector measuring Vr must be both perfectly balanced and have infinite impedance, and the signal source must have zero output impedance. While a simple diode detector can have reasonably high impedance, at least at some frequencies it is not infinite, and making it balanced and sensitive at low levels is also difficult. For these reasons many of these simple bridges only give reasonable results when used at significant power drive levels, this in turn causes problems with resistor wattages. A clear indication of problems with this simple design is seen when comparing measurements made relative to a short and an open. Both short and open should ideally give a reflection co-efficient of 1, that is, an equal result, however with some simple designs there can be considerable differences between the two measurements and usually neither is correct.

An alternative slightly more complicated approach is used in the design here based on Figure 1b, the so called terminated bridge. Here you can see that the source has a real output impedance, and the detector has a real input impedance. This arrangement is more complex to analyse but it can be shown (Reference 4, for example) that, so long as all the impedances Zo are equal, the equivalent results for Vr being a measure of the reflection co-efficient, all-be-it with a different (smaller) constant multiplier, can be obtained.

The requirements for the Figure 1b case are much easier to satisfy. Most signal generators have a 50 Ω unbalanced output, and getting some sort of sensitive 50 Ω unbalanced receiver or detector is not hard. The only problem left is the connection of the unbalanced detector to the balanced bridge. It cannot be directly connected without unbalancing the bridge and losing accuracy, so some sort of balun is required. Note that the Zo resistor across Vr, and the one in series with the voltage source, are not physically present in the RLB circuit: they are the signal generator's output impedance and the detector's input impedance, in this case as reflected through a balun. The only thing we need then is a good 1:1 balun and to ensure that what is on one side of the bridge is exactly duplicated on the other, i.e. it is symmetrical. Put another way, great care needs to be taken that the only difference between the reference termination and the unknown side of the bridge is the

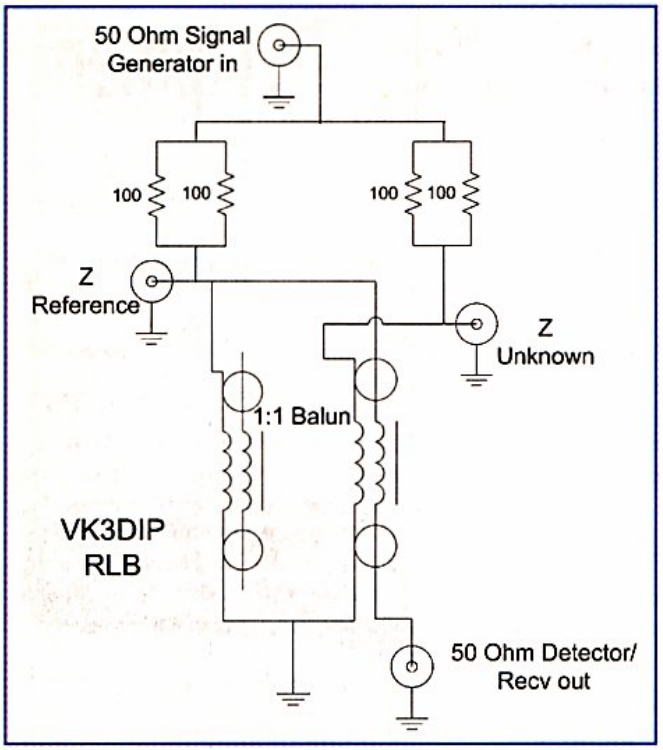


Figure 2: The RLB circuit.

unknown, or what you want to measure, itself. For example, many RLB designs terminate the reference side of the bridge directly with a soldered in 50 Ω resistor. While at lower frequencies this doesn't make much difference, as the frequency goes up the differences in impedance between that soldered in resistor and say an exactly equal value resistor, but connected via a BNC plug and socket, starts to make a difference. The purist may say that the bridge is only telling the truth that the connector is not perfect and you should measure it, usually however you only want to measure what is connected by the connector, so by balancing it out it can be removed from the measurement. The design here for this reason uses connectors to bring out both the reference and unknown ports. This also gives increased flexibility to the uses for the bridge. Similarly many designs get over the need for a balanced detector by just using a simple diode arrangement directly across the bridge and even neglecting the inaccuracies caused by the small voltage drop across the reference. The design here instead uses a 1:1 balun, this means we can use a normal unbalanced tuned receiver as the detector, which means measurements can be made at much lower power levels, and there is much less likelihood of getting misleading results caused by the signals of say the local broadcast station being detected by the diode rather than the actual test signal.

Circuit Details

There are many designs for RLBs available in places like Reference 2 and 3, and on the web and the only claim to any sort of originality here is the combination of components, the layout, and perhaps the construction of the balun used. The RLB presented here is relatively simple to build, costs very little, helps to prevent interference on the bands, and the prototype gives good results measured on all the ham bands up to at least 70 cm. The RLB here consists of four resistors, a homemade balun, some connectors, a few bits of PCB, some short lengths of coax, and a box.

The circuit of the RLB is shown in Figure 2.

As can be seen, the four 100 Ω resistors are used in two parallel pairs to give 50 Ω each. I used 1% surface mount resistors to minimise lead inductances and the like. This will however limit the maximum power that can be applied to this RLB but as I intend it only for use with a signal generator, probably via an external attenuator, this is not a problem.

The signal source is connected at the top, and the calibrated receiver or similar detector is connected at the bottom. The two ports in the middle are interchangeably the unknown and reference ports. The 1:1 balun used as indicated in the circuit is a little bit different from what you would normally see and needs a bit more explanation.

Caution, as you will see from Figure 2 in this RLB, the particular design of balun used here means that there is a DC short across all ports save the Signal generator one. A DC only short across the receiver/detector might cause some problems if you are using a transceiver as the receiver which had, say, a DC feed on

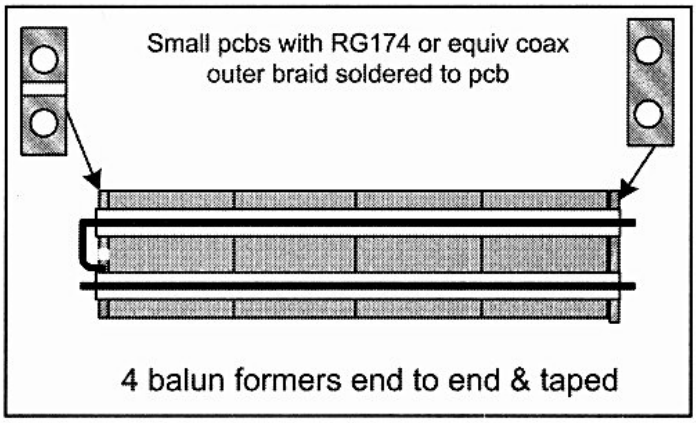


Figure 3: Balun construction.

the antenna connector or some switching voltage present. Similarly if you want to measure an unknown which may have a DC level on it, say the input stage of a pre-amplifier you will need to ensure DC isolation. This will not be a problem for most people but it is worth checking your receiver manual, for instance, before taking any risks.

The Bridge balanced to unbalanced transformer (balun)

Amateurs commonly use two types of baluns; choke/current baluns or transformer/voltage baluns. I won't go into the relative merits of each, as there are lots of opinions on this in the amateur literature, suffice to say here I have used a configuration that is a bit of both. If you just look at the right hand half of the balun it can be seen to be a conventional ferrite choke type, that is, a short length of coax with ferrite beads along its length. The problem with just this alone is that while the impedance of the current path on the coax outer surrounded by ferrite back to earth is quite high it is not infinite and it is only across one side of the bridge. Thus to balance this high impedance we have on the other side of the bridge an identical high impedance to earth formed by an identical piece of coax and ferrite. Note only the outer is actually used on this second piece of coax. This extra balance item also makes the balun equivalent to a voltage or transformer action balun. This can be more easily seen if we forget about the fact that we are using coax and as I am using standard two hole (ie figure 8 style) ferrite balun formers think of it as simply three (one turn) windings on a transformer connected as per a normal one-to-one transformer balun. This arrangement gives the best of both worlds leading to a balun that is usable over a number of frequency decades. It is this balun frequency response which is the biggest contributor to the bandwidth of this particular RLB.

Construction

Construction starts with making the single most complex piece of the RLB, the balun. The balun is made using four, two hole, ferrite formers taped together into one bigger former, with short lengths of thin coax through the holes soldered onto small bits of PCB at each end as shown in Figure 3 to make the "windings". This can also be seen in Photos 1, 2, 3 and 4 which show the balun in various stages of construction.

The rest of the construction uses another small bit of PCB to hold the resistors as per Figure 4. I used a small hand drill with a milling bit to make it. You could also have a version with slightly poorer upper frequency performance, but better power handling, by not using this board and just soldering pairs of 100 Ω 0.25/0.5 W resistors directly between the various terminals. Obviously the shorter you can make the leads in this case the better.

In my case I fitted the RLB into a small diecast aluminium box, which I understand may not still be available in this size. See "getting the bits" later. If you don't have one of these exact boxes the next size up is still available and you won't have quite as much trouble as I had squeezing the RLB in. At worst you may have to use slightly larger pieces of PCB.

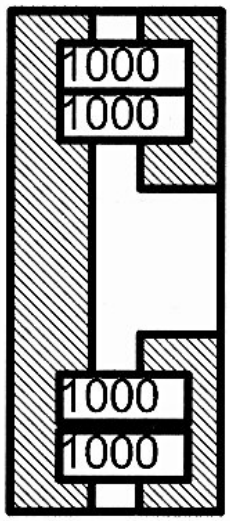


Figure 4: Resistor board.

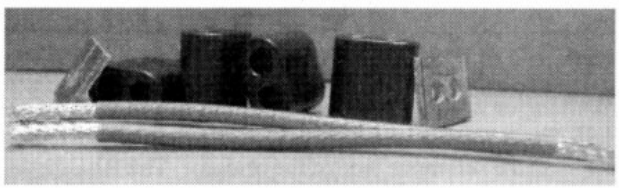


Photo 1: The pieces to make the balun. Note I used small lengths of teflon coax to prevent problems with the inner melting while soldering. Normal RG174 should work also but be careful when soldering.

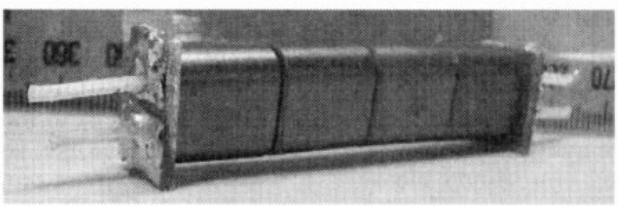


Photo 2: Partially assembled. Note outer braid of coax is taut, and holds the formers together.

Photo 3: Formers wrapped in tape, I used clear tape just so you could see the formers, but other should work just as well. Also note I had to trim down the end pieces of PCB a bit to fit. The end shown is the end that goes to the resistors so that one centre conductor is bent over to connect to the other side and the other centre conductor is cut off flush.

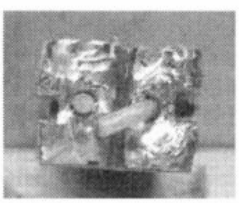


Photo 4: Close up of resistor end of balun. Note I also had to cut a couple of notches in the PCB to fit the ends of the BNC connectors. You won't need to do this if you use a bigger box.

I cannot however comment on what might be the effect on performance, as I haven't had any feedback from people who have gone down this path to date.

The final assembly is as per Figure 5, and Photos 5, 6 and 7.

Testing it out

The prototype was tested for directivity, which here is simply a measure of the difference between the balanced and maximally unbalanced states of an open and/or a short on the unknown port. This effectively is the maximum Return Loss that can be measured with the RLB. The result should be infinite but in practice a result over 40 db is good enough enabling measurements down to an equivalent VSWR of 1.02 : 1 as shown in Table 1.. The results obtained from the test setup shown in Figure 6 are shown in Graph 1. For interest these results were obtained using two identical cheap coax ethernet terminators. The two curves on Graph 1 show the measurement relative to an open circuit and a short circuit.

The results show the RLB is quite useable with a greater than 40 dB value obtained over the full range of ham bands up to and including 70 cm. The RLB is particularly good over the VHF 28 to 144 MHz bands where directivities in the very high fifties, were obtained. This compares very well to equivalent commercial models of RLBs.

The very good agreement between the open and short cases demonstrates that as well as the RLB being well balanced that the impedances seen at the source and receiver ports are close to 50 Ω. This is in part due to judicious use of the fixed attenuators. I placed the 12 dB at the receiver end because I was less sure of its input impedance, whereas the signal generator I used is known to be a reasonable 50 Ω source.

Note: The testing done here was with my own far from laboratory standard equipment at a relatively small number of discrete frequencies. A sweep using a spectrum analyser or network analyser might find some dips and bumps that I didn't happen to spot.

Some Return Loss bridge accessories

In Photo 8 you will see the RLB along with some of the various accessories I use with it.

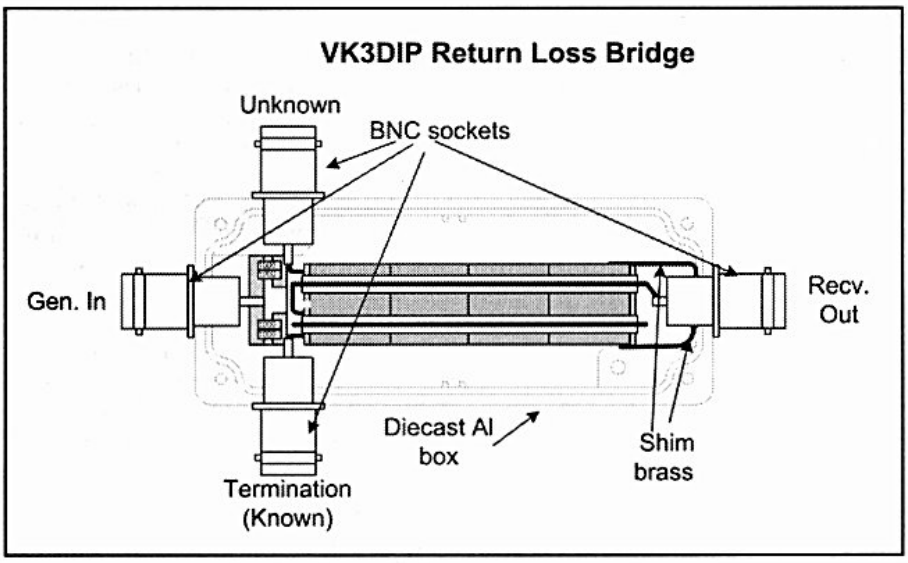


Figure 5: Fitting it together.

1. Attenuators, fixed and switched variable.

Photo 8 item 1 shows a number of fixed attenuators. I use this set for many things, it is made up of 1, 2, 3, 6, 12 dB values. This combination ensures I can make up any value from 1 to 24 dB in 1dB steps. Some of these came from surplus, but the others can now be purchased for quite reasonable prices from Jaycar. As well as these fixed attenuators I also use some switched (not shown) ones as the case requires. These are either home made or ratted from dead signal generators.

2. Terminators - matched, open, and short

Shown in Photo 8 item 2 is a set of special BNC terminators, one each of open, short, and terminated (that is, 50 Ω), also shown here is how two 50 Ω

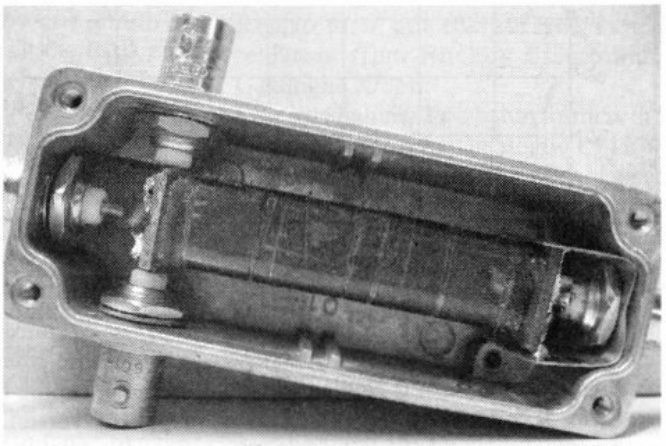


Photo 5: Balun inserted in box. BNC connectors were put in first then the balun soldered at the reference/unknown end first. The balun then hinges at this point and can be swung down to mate with the brass shim and the receiver BNC.

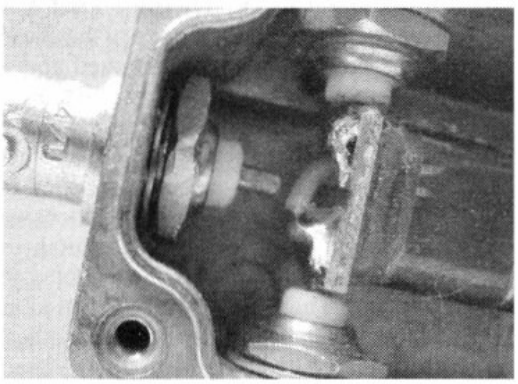


Photo 6: Close up of the reference/unknown end.

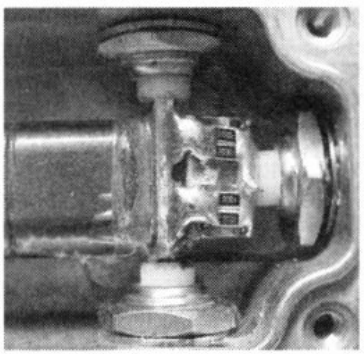


Photo 7: The resistance board added.

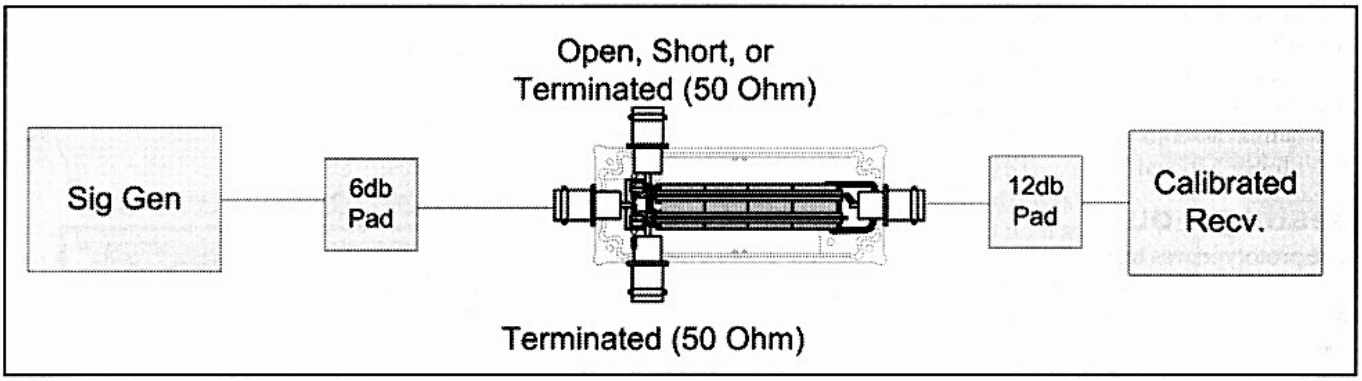
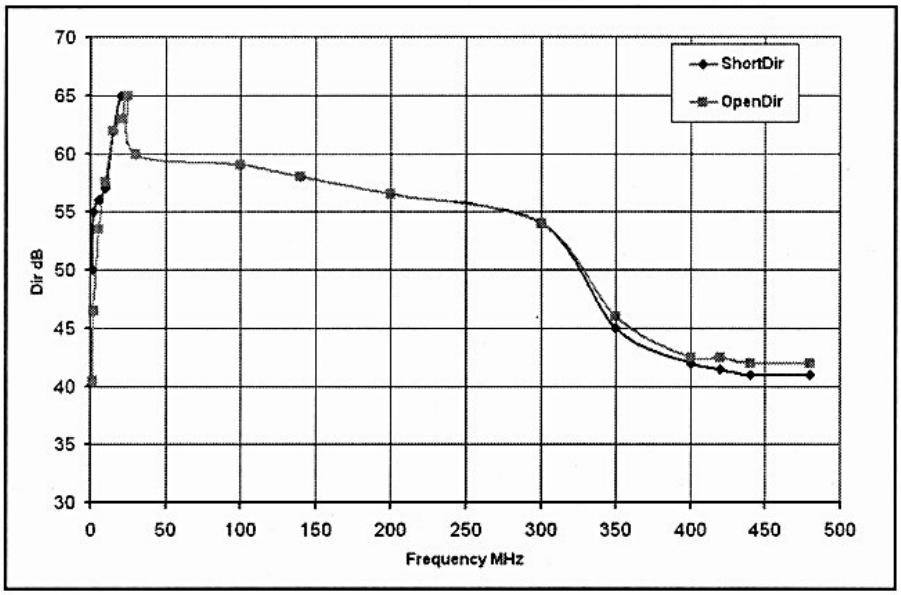


Figure 6: The test setup, the pads are to minimise effects of varying loading and frequency changes of the impedances of the signal generator and the receiver.



Graph 1: Measured directivity of the prototype showing usable directivity up to at least 70 cm.

terminators can also be combined with an ex-LAN BNC tee connector to produce a known 25 Ω load or 2:1 VSWR, which is about 9.5 dB Return Loss. I tried various versions of these and if you don't have access to commercial ones, the best I found was to get some surplus ethernet (that is, computer networking) 50 Ω terminators and use those as the basis. There was considerable variation between the many different "brands" of terminators, so test what you find before you rely on them. The best ones I found were those shown which have a green plastic top on basically a standard crimp BNC connector with what looks like a 1 watt 50 Ω metal film resistor in the body. The green cap can easily be removed to get access to the resistor. To produce the open circuit, just snip off or otherwise disconnect the end of the resistor lead connected to the outer of the connector, and the short circuit is made by removing the resistor entirely and replacing it with a bit of wire connected to a bit of brass shim across the body of the connector. I got my versions of these terminators from Rockby Electronics, who had them for 30 cents each.

3. Broadband Detector

Photo 8 item 3 is a home-made broadband diode detector. This was made yet again utilising one of the cheap Ethernet terminators mentioned above by removing the resistor and replacing it with a hot carrier diode. One end of the diode goes to the centre pin and the other to a feed-through capacitor attached to the connector body by a small extension made out of brass shim. A digital, or otherwise, multimeter is connected to the end. The BNC tee piece is used as shown to make it either a 50 Ω (or other) terminated style detector or by itself as a high impedance detector. I could calibrate this but as I mainly use it for relative measurements I haven't needed to as yet.

A much better solution for this would be something like an AD8307 integrated circuit logarithmic detector from Analog Devices which gives a 93 dB range at greater than 500 MHz. An even better one would be one based on the AD8302 which adds phase detection as well and works up to 2.7 GHz, even though it does have a slightly lower dynamic range. It's a pity it is so difficult to get these bits in one offs in Australia, as with the one IC AD8302 and this RLB you could basically have the main parts of a vector impedance meter/ network analyser.

4. Variable R/X widget

This RLB isn't only useful for measuring return loss. By just connecting a variable impedance to the reference port, the RLB can be used as a simple impedance bridge. I just tweak a couple of components connected to a BNC connector at the reference port until I get a null at the receiver port. The tweaked impedance on the BNC is then just removed from the RLB and placed on a RLC meter or equivalent for measurement at a few kiloHertz or other more manageable frequency. Of course if just using a resistor, your multimeter will do fine. Photo 8 item 4 shows a case of a 500 Ω pot, and a 100 Ω trim pot in series with a trim capacitor.

5. Broadband Amplifier.

One of the problems with a broadband diode detector is correctly detecting deep nulls. Or more correctly, differentiating deep nulls from small dips. As the diode output tends to drop off rapidly at the low end, this can be a problem. You can of course use more power but if you want to do measurements over a broad range of frequencies you may not have suitable

transmitters for this, you also run into power dissipation problems. To help with this, I have made up a small box with basically a hybrid IC as used in TV antenna masthead/distribution amplifiers which basically gives me some 16 dB gain fairly flat from a nominal 30 to 870 MHz, with usable gain either side extending its usefulness (Photo 8 item 5). The impedance is a nominal 75 Ω but the datasheet (and my tests) show it working fine at 50 Ω using some of the fixed attenuators to give a clean 50 Ω to the RLB.

This is a good example of where using Return Loss to work out what happens is easier than VSWR. If we just connected say the 75 Ω directly to the 50 Ω system, then from Table 1 looking up the equivalent load resistance column, we could see that this would be a 14 dB Return Loss (also a 1.5:1 VSWR as expected). If we added now a 6 dB fixed attenuator then this would simply add 12 dB (twice the attenuation because the forward wave passes through it once, and once again for the reflected wave on the way back) to the Return Loss giving 26 dB which again Table 1 shows as an equivalent load resistance of 55 Ω and a VSWR of 1.1:1. A 12 dB attenuator adds 24 dB to the Return Loss and leads to a 51 Ω equivalent impedance and a 1.025:1 VSWR. In practice, it works even better than this as the nominal 75 Ω of the amplifier was actually lower than this value. How do I know? Simple: I measured it with my RLB!

6. Known Coax Lengths and Connectors.

Photo 8 item 6 is just one example of the miscellaneous bits of coax and connectors that can be used with the RLB. The item shown is useful for connecting to items under test at lower test frequencies. One of the very useful items in this class is a bit of coax a multiple of half waves long at the measurement frequency. This comes in handy when measuring impedances as it saves having to calculate the actual value at the load or antenna using a Smith chart or equivalent computer program.

7. Other Bits not shown.

As well as the above, there are a number of items of test equipment that fit in well or are required with the RLB.

A low power transmitter or one with a power attenuator on its output can be used as a signal source but a good signal generator is much more friendly, with simple control of levels and usually well known output impedance characteristics.

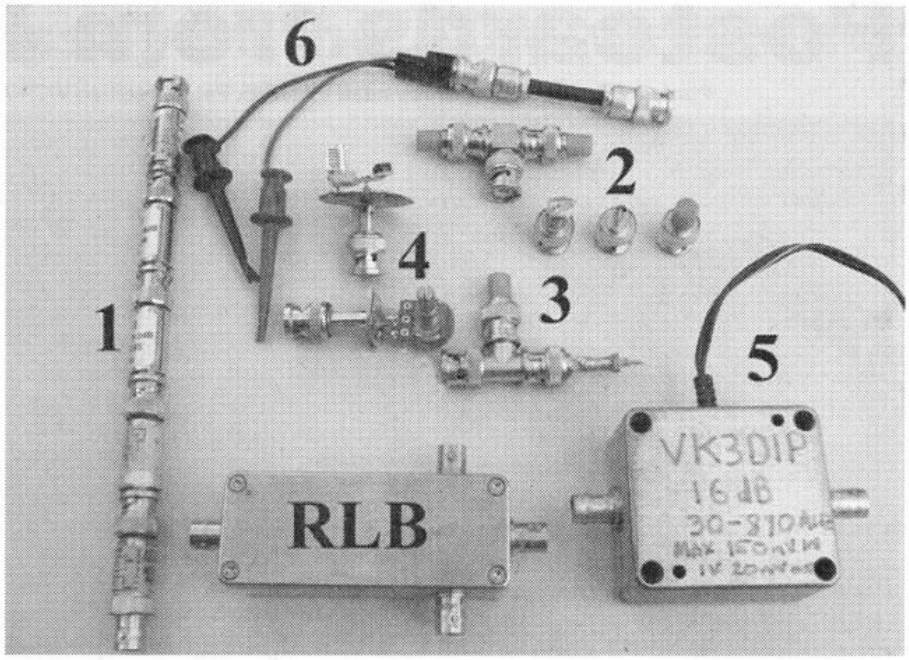


Photo 8: RLB and accessories

The diode detector and amplifier above can be used with the RLB but a tuned receiver will work much better at exploring deep nulls while rejecting the local broadcast band station. Any receiver with a good S meter can be used, but few ham band models have a true 50 Ω input impedance, so here again the fixed attenuators come in handy. A calibrated receiver, a frequency selective voltmeter, or even a spectrum analyser, would be better still each having better known impedance characteristics, built in attenuators, and higher dynamic range, but few hams can run to these.

Something that a number of hams have is an oscilloscope. The oscilloscope, (with either attenuators, or a parallel 50 Ω load using a BNC tee piece for impedance matching) makes a very nice detector when used within its frequency range. It can also show if you are getting any distortion or unwanted signals coming in.

Finally the holy grail of RLB use is the network analyser, or vector network analyser, this does it all, being the signal generator and the detector giving both magnitude and phase of the reflection co-efficient. While there are some home made versions of these out there they are still very complicated beasts. Maybe if AD8302's and equivalent DDS IC's get more readily available to the ham community here, this will change.

Getting the bits

Resistors: I got the surface mount resistors from Rockby Electronics, Catalogue 27556.

Ferrite baluns: Two balun formers in a packet from Jaycar, Catalogue LF1220.

Box: The 36 x 90 x 30 box I used originally came from Dick Smith, Catalogue H2230, and you may be able to find the same thing at other suppliers. Some people may have difficulty with this small size, so using the next size up diecast box, such as the Jaycar Catalogue HB5062 will make things a bit more roomy to work in and is a bit more commonly available.

PCB, and BNC Connectors: Places such as Dick Smith, Jaycar and Rockby have these.

Coax: In my case, from the junk box. You might have to get creative if you decide to use teflon coax, as the only commonly available type I can find would be either the local club hamvention for surplus/second hand, or cutting up the Wi-Fi extension cable sold by Jaycar, Catalogue WC7802.

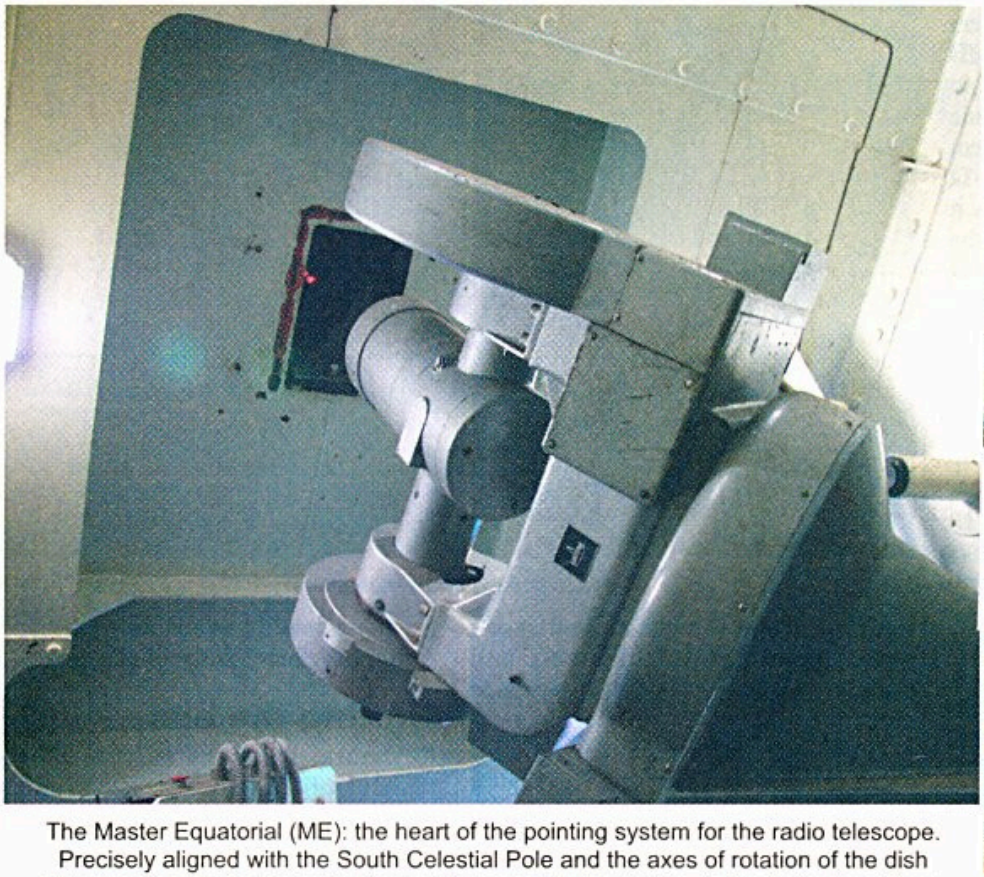
Fixed Attenuators: Make them yourself or see Jaycar, Catalogue LT3053 and similar.

Ethernet Terminators: Most computer swap meets, or Rockby, Catalogue 12984.

continued on page 30

Postcards from Parkes — A

Photographs by Robert Broomhead VK3KRB, Peter Freeman VK3KAI and Chris Morley VK3CJK. Text by VK3KAI.



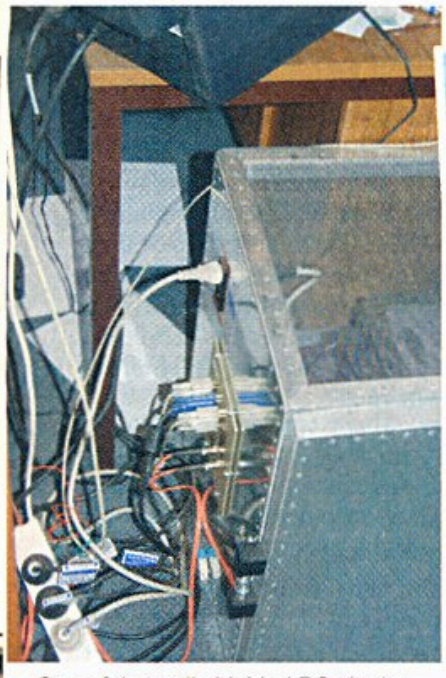
The Master Equatorial (ME): the heart of the pointing system for the radio telescope. Precisely aligned with the South Celestial Pole and the axes of rotation of the dish structure, the ME is moved by the guidance computers to the desired direction. Servo mechanisms plus laser optics then move the dish and its support structure (all 1000 tonnes) until all is in alignment. VK3KRB.

As we were inspecting this original component of the system, a large repositioning occurred. It was strange having the Master Equatorial moving to face you and to then feel the entire dish structure starting to move to the new position (VK3KAI).

A tour group examines the rotating drive mechanisms of the radio telescope – essentially an oversized battleship gun turret drive mechanism! The people on the gallery give scale to the immense size of the dish. VK3KRB.

Brett Dawson VK3CBD explaining the hanging ca which allows the dish to rotate 540 degrees befo unwind. Brett, the Receiver Engineer and second the facility, explains that the cable run is 150 met analogue receiver units on the third level of the b the Focus Box. VK3KRB.

selective photo essay of the AGM weekend

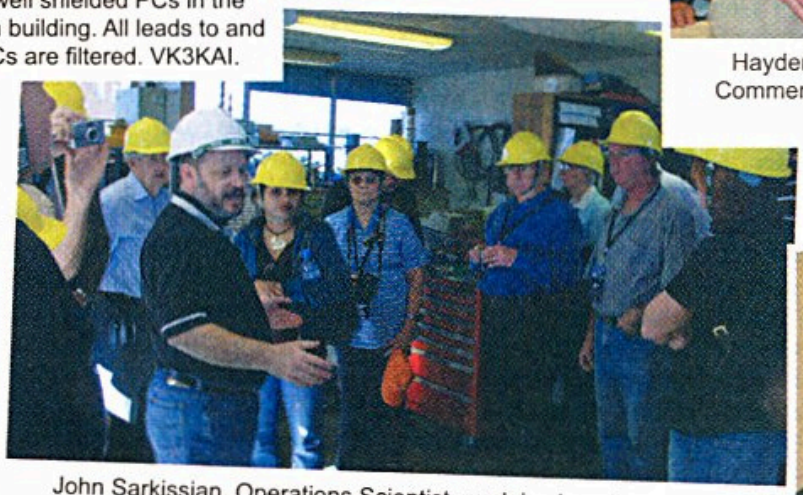


One of the well shielded PCs in the administration building. All leads to and from the PCs are filtered. VK3KAI.

A tour group about to enter the radio telescope building, with the now unused 18 m "small dish" in the background. VK3CJK.

Hayden McManus VK3FRST with his President's Commendation Award, received from WIA President Michael Owen VK3KI. VK3KRB.

able network, re needing to d in charge at tres from the building up to



John Sarkissian, Operations Scientist, explains how the Receiver modules are assembled. VK3CJK.

An animated Rex VK7MO receives the Ron Wilkinson Achievement Award on behalf of Justin Giles-Clark VK7TW. VK3KRB.

Staff at "The Dish Café" were kept busy on Friday evening, with approximately 130 amateurs and family in attendance in addition to the members of the Central West Astronomical Society. VK3CJK.

What can you do with this Return Loss bridge?

1. Measure Return Loss, magnitude of the reflection coefficient, and VSWR.

Measuring Return Loss is straight forward with two basic techniques that can be used. Which is easiest will depend in part on the actual signal generator and/or receiver you use.

The first method I find simplest if you have a reasonable signal generator with good variable output level/attenuation, but are perhaps using a normal ham receiver or un-calibrated diode detector. In this method the first thing you do is set the equipment up more or less as per Figure 6 and with a short or open connected to the unknown port, and the reference terminated with the 50 Ω load, set the output level of the signal generator such that it is on the frequency of interest and there is a well recognisable level indication on the receiver, say S 9 on the meter. The absolute level doesn't really matter, just that you can tell easily when you are there, and that you have noted both this level and the setting on the signal generator that produces this. The open or short termination is now replaced with the unknown you wish to measure, and the output from the signal generator increased (assuming here that the unknown is better than an open or short) until the reading on the receiver is back to the original say S 9. The difference in level of the signal generator before and after is the Return Loss, which, if as usual the signal generator output level is calibrated in dBs, will be in dBs.

The second method is similar to the first but here instead of starting with the open or short we start with the unknown connected and set the value, then connect the open or short, and increase the attenuation between the RLB and the detector until we are back where we started. I find this works best if your detector is a bit deaf as you set the first level which is the lowest such that you know you can detect it.

Obviously any combination of these two extremes also works. Basically you are simply getting a measure of the difference between the open or short and the unknown case. Remember however bigger number means better match.

Given the Return Loss, getting the magnitude of the reflection co-efficient, or VSWR is either a case of just looking up Table 1, or calculating them using some computer program or equivalent.

Remember this works whether you are using an antenna on the end of a transmission line, or the input of a gee-whiz pre-amplifier you are building. This is something that would be impossible in the normal VSWR case due to the power levels you would have to be using.

Sometimes you don't need to measure the actual value of Return Loss, just to maximise the value (that is, minimise VSWR, minimise reflected power, get the best match, and so on). As an example of this, say you are trying to optimise the input to an amplifier stage, you can just connect it to the RLB and tweak its input matching until you get a minimum (null) on the receiver.

2. Measure coax losses

Given a length of coax that you want to measure the losses of, the line loss is found by connecting it to the RLB with the reference port terminated in 50 Ω, and the line open circuited at the end. The Return Loss is then measured as per 1 above. With no losses in the coax, there will be no difference between the open circuited coax connected to the RLB and the open circuit terminator connected. For practical cable with losses, we have the case similar to the impedance matching using attenuators mentioned earlier, i.e. the coax losses will be half of the measured improvement in Return Loss. Remember the factor of two is because of the power having to travel once along the line from the RLB to the open circuit at the end of the coax and once as the reflection all the way back.

3. Measure coax, physical and electrical length

Connect a shorted termination to the reference port, so we are not really measuring return loss but more using the bridge aspect, and short the end of the piece of coax to be measured and connect it to the unknown port. Now as you sweep the frequency from your signal source you should notice that the output on the receiver/detector (that is, amplitude,) goes from peaks to nulls. The nulls will correspond to frequencies where the electrical length of line is a multiple of a half wave at that frequency, and the peaks will be when the line is an odd multiple of a quarter wave at that frequency. At the half waves, the short at the end is being repeated at the unknown port and balancing the short at the reference port. At the odd quarter waves, the short is transformed to an open at the unknown port and this maximally unbalances the bridge. If we want to find the physical length and we know the cable velocity factor then you measure the frequency difference between two adjacent nulls (or two adjacent peaks if that is easier to see) and then cable physical length (ignoring losses) will be given by:

$$L = 150 \times \frac{Vf}{\Delta F}$$

Where:

L = physical length in metres,

Vf is the coax velocity factor as a fraction, and

ΔF = frequency difference in MHz of adjacent nulls.

Note the nulls must be adjacent for this to work, that is, next to each other frequency wise with no other null in between, this ensures that the difference in the multiples of half waves is one.

For example, if you measure nulls to be at exactly 10 MHz, and the next at 20 MHz then the frequency difference will be 10 MHz. If the cable velocity factor is 0.67 then the physical length is:

150 x 0.67/10 = 10.05 metres.

You can work back the other way if you know the physical length to get the velocity factor of a piece of cable from:

$$Vf = \frac{L \times \Delta F}{150}$$

For example, you measure your cable to be physically exactly 10 metres long and the nulls are exactly 10 MHz apart then the velocity factor will be 10 x 10/150 = 2/3 = 0.66667.

The accuracy of these values can be improved by using an average value for the frequency difference, that is, if you find three nulls and the differences are 10.1 MHz and 9.9 MHz then the average value of 10 MHz will give a better result.

For short pieces of coax it is probably simpler to use the same set up with shorted cable and short reference and just find a single null and use:

$$L = N \times 150 \times \frac{Vf}{F}$$

Where:

N = the whole number multiple of half wavelengths in the cable,

F = the frequency of a null in MHz.

You need to first estimate what multiple N is of course but you can usually get a reasonably good idea of this whole number by using typical cable velocity factors and measured length.

This approach also works for cutting a length of coax to a specific electrical length. In this case it is simpler to have the coax open circuited where the nulls will correspond to odd multiples of quarter waves and the peaks be half waves.

For example, if you wanted a piece of coax exactly one quarter wavelength electrically long at a particular frequency, then you roughly calculate the length based on published coax data, add a bit just in case and connect it to the unknown port with the other end open. The signal generator is set to the frequency of interest and with the reference port shorted, you cut bits off the coax until you get a null on the receiver/detector. If you never get a null then the safety margin you added at the start must not have been enough and/or the cable is not as per the published specifications for velocity factor.

4. Measure the impedance of an antenna/load/component

There are several methods for calculating impedance using a RLB. The simplest is if you can measure both magnitude and phase of the reflection co-efficient, but as that requires more complex test equipment than most hams have access to (or one of those elusive AD8302s), other more complicated methods have been found to get around this. All of these methods rely on doing a second measurement using either an added known resistor in series with the unknown, or changing the effective system impedance series. These all require quite complex calculations or playing with Smith charts to get a result, often when you are done you still do not get the sign of the reactance. Further method descriptions are well beyond the scope of this article, but have a look at references 5 and 6 if you are interested.

A simpler method uses the RLB as a normal bridge by replacing the reference terminator with a variable component such as shown in Photo 8 item 4. Using this method, the unknown is connected up and the reference is replaced with one of these R-X widgets and the values adjusted until a null is achieved, ie at the frequency under test the impedance of the test item will be exactly the same as the tweaked value of the reference.

This is basically using the RLB as a classic impedance measurement bridge. In the classic bridge case, a lot of the work required to build one is spent in calibrating the scales on the variable components and trying to get the range of values required. In my case, it may take a little longer to take a measurement, and may occasionally require a soldering iron to add some more C or to replace the variable C with some variable L, but no up front calibration is required. Instead once the null has been achieved, I simply disconnect the BNC connector with the widget from the RLB and connect it to either a multimeter if I was using a single resistor, or some form of audio or other RLC measuring device.

One I find works particularly well in this case is a PC soundcard version (Reference 7). The only tricks are (1) that you need to get your LCR meter to measure in ohms for resistances, farads for capacitors, and henries for inductors, then you can convert them into reactances at the particular frequency of interest if you need them, and (2) that if you want to measure an impedance at the other end of a bit of coax, you can either use a Smith chart or a computer program substitute like the ARRL TLW program, or again as I have mentioned before, use a piece of coax that is an electrical multiple of a half wave at the frequency of interest.

This later technique can also be used to work out the impedance of a bit of unknown coax by measuring off an electrical quarter wavelength as per 3 above and then terminating it with a known resistance, and measuring the effective impedance at the bridge.

The coax impedance can then be found from:

$$Zo = \sqrt{Rk \times Rm}$$

Where:

Zo = coax characteristic impedance,

Rk = the known test terminator value at the end of the coax,

Rm = the measured value at the port, all in Ohms.

5. Use it as a hybrid combiner

The RLB described is identical to a hybrid combiner. These are used to combine the signals from two signal generators (connected to the source and receiver ports of the RLB) to one signal at the unknown port. The circuit here is such that neither signal generator output will affect the other one, and the output impedance will be a clean 50 Ω one. This setup is common when doing two tone inter-modulation testing of receivers.

6. Do network analysis

If you happen to have a network analyser or a spectrum analyser, then you probably already know the sorts of things you can do with them and a RLB.

Conclusion

Hopefully, you are motivated to build one of these, and are asking how did I ever survive without one. Perhaps more realistically, you will keep this in mind as a possible cheap and simple construction project that you could try out one rainy weekend. While I have described a lot of things you can do with this bridge, I am sure that hams out there can think up many more useful things it can do. Not bad for something with no active components and just a couple of resistors and a balun.

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4. "A Bridge Method of Sweep-Frequency Impedance Measurement" – Ken Simons W3UB
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6. "Impedance measurements using an SWR meter" Ben Lowe K4QF
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7. "An LMS Impedance Bridge"Dr. George R. Steber WB9LVI
   QEX, September/ October 2005, p 41-47

ar

News from...

VK2

Tim Mills VK2ZTM
Via vk2wi@ozemail.com.au

Clubs

On Saturday morning 23rd June, the Waverley ARS will have their annual auction in their club rooms at Rose Bay. The Oxley Region ARC has its annual Field Day at Port Macquarie over the June long weekend 9/10th. The new, Mid North Coast Amateur Radio Group is getting in early advising their 2008 Field Day, scheduled for Sunday 20th January at St. Johns Church Hall in Coffs Harbour. Summerland ARC have their SARCFEST on Sunday 12th August. The Kurrajong Radio Museum, developed by Ian VK2ZIO, was featured in the May 2007 edition of *Silicon Chip*.

WICEN (NSW) Inc is involved in the Nav Shield exercise over July 7 and 8, the annual Shahzada Horse Enduro for a week at the end of August, and the Hawkesbury Canoe Classic at the end of October. These events require a lot of personal input and they are also fun. Another active WICEN region is up north with the Summerland ARC. Contact with WICEN is by post to P. O. Box 126 Gosford NSW 2250. Telephone to the Duty Operator 0408 397 217. Email to operations@nsw.wicen.org.au or visit www.nsw.wicen.org.au

Many repeater groups across the country have trouble obtaining and keeping an economic site. Access is no longer cheap. The problem confronts the Sydney based St. George ARS who provide the Mt. Bindo VK2RDX 6650 repeater on the western edge of the Blue Mountains. Installed in the early 1970s, the site has had a colourful history. Soon after it was installed, persons unknown cut the tower down, twice. The site is a fire watch location. In the early days of country television, an off-air reception point was established there to source Sydney programs for the Orange commercial. The television equipment was housed in a purpose built solar-powered installation. When linking of television services improved, the installation became vacant and St. George was able to take over the lease and building. The full price of the lease is several thousand a year and until recently St. George was able to obtain a substantial discount, which made it an attractive system to provide for amateurs west of the mountains. Now the discount has been reduced and the new rent is a quarter of the annual site fee. This year St. George is able to fund the rent but they have to consider the future. A lease condition is that the installation be totally removed and restored to its natural beauty once the site is no longer required, an expensive exercise. St. George are considering their options.

ARNSW

The AGM for ARNSW was held on 14th April with a good attendance. There was the required number of candidates to fill the Council positions, so an election was not required. A few matters were raised by members with the reports and accounts, which will be addressed by the incoming Council. The main office bearers determined after the AGM were President – Norm Partridge VK2TOP; Vice President – Barry White VK2AAB; Secretary – Brian Keegan VK2TOX and Treasurer – Beth Langley VK2AO. Other positions were to be determined at the first committee meeting in May.

At the formation of the new WIA structure in 2005, the VK2 QSL Bureau, operated by Westlakes ARC, became a national service. ARNSW arranged a two year service of forwarding cards to VK2 members. This arrangement will terminate at the end of June this year. VK2 amateurs will have to make direct contact with the QSL Bureau to arrange delivery of QSL cards from the 1st July. Contact can be made via Westlakes voice mail box on 02 4958 1588.

The installation of a shed at Dural was again delayed in April when the local council decided it had to be set further from the side boundary. This has put possible approval and construction back a few more months. It had been expected that the office facility would have by now been at Dural. When the Wigram Street property was sold, the telephone number was redirected to the temporary office. This redirection may end this month and a new number may be required for ARNSW. Details will be given in VK2WI News and this column once determined.

The next exam provided by ARNSW has been changed to the weekend of June 30 and July 1. Applications will close on Tuesday 19th June. The next T&T will be Sunday 29th July. The Veterans Group of ARNSW meets on the third Thursday of the month at 11 am at the Ryde Eastwood club at West Ryde, the location of the recent AGM.

VK2WI

The transmission from VK2WI at 10 am is provided on a range of frequencies from 160 metres to 23 cm. Regional repeaters are important, providing local area coverage. Those close to Sydney are linked to VK2WI. Those further afield rely on local amateurs taking a signal from one or more of our HF frequencies and feeding it into their local repeaters. Band conditions often make this difficult, with the 80 metre ground wave dropping out before the 40 metre skip comes back to earth. To overcome this, VK2WI has been licensed by ACMA for a 5 MHz fixed service frequency to provide a link function. The service will be introduced as soon as the installation is carried out. It will operate on the frequency of 5423.5 kHz with 100 watts in the USB mode. It will be identified as VK2RWI and will transmit only – defined as a single to multipoint service. It is a different frequency from those allocated to WICEN. A morning only transmission, it is not yet available for evening.

The evening VK2WI news service at 7.30 pm to the country regions has to rely primarily on 80 metres, as the previously mentioned overseas DRM transmission has returned to co-channel the 40 metre -7146 kHz signal. Australia is off the side of the DRM antenna and it is reported that the DRM signal does not venture across the Great Divide. Reports on the level of interaction between the transmissions would be welcomed. If you want to check out DRM signals, see the article in the April issue of *AR*. A broadcast band DRM transmission commenced in Sydney at the end of April on 1701 kHz.

May 19th was the 50th anniversary of the opening of the VK2WI building. Celebrations were to be included in the regular T&T event at the end of May.

VK3

Amateur Radio Victoria News

Jim Linton VK3PC
Website: www.amateurradio.com.au
Email: arv@amateurradio.com.au

Recognition overdue

A recent review of amateur radio activity in Victoria identified a number of achievements that while being 'mentioned in dispatches' have not received due formal recognition.

The Amateur Radio Victoria Council considers that four individuals and two organisations have done worthy things this decade, well deserving of an award.

In recognition of their efforts each will be named on a perpetual trophy and join others who have won this award dating back to the 1950s.

Full details and the award recipients were due to be announced at the Annual General Meeting held late last month.

Mentor Hall of Fame

An increasingly important aspect of amateur radio is experienced and knowledgeable individuals encouraging new licensees or less experienced radio amateurs.

A Mentor (or Elmer) is one who does much more than just teach amateur radio licence classes, although that activity is very honourable. In fact not all inductees into the Mentor Hall of Fame are instructors.

They are individuals, who in the tradition of amateur radio, give of their time and knowledge over a considerable period of time to help others increase their awareness and develop skills in various aspects of the hobby, including its traditions.

Many of today's radio amateurs can attribute their involvement in and continued enjoyment of amateur radio to a Mentor.

Amateur Radio Victoria encourages Mentoring and through its Mentor Hall of Fame pays tribute to Mentors, both past and present.

Nominations stating why a person should be considered for induction can be emailed to arv@amateurradio.com.au and please put 'Mentor' in the subject line.

Promoting amateur radio

Members from a non-English speaking background (NESB) are being encouraged to register for a new publicity effort aimed at raising awareness of amateur radio among their communities.

Similar to the campaign in suburban and selected regional newspapers we are now looking for 'ambassadors' willing to be interviewed and photographed by ethnic newspapers.

These publications are widely read and can be an effective way of communicating the message about amateur radio and especially the Foundation Licence.

Registration for the NESB initiative can be easily done online via the Amateur Radio Victoria website.

RadioFest

Thank you to those who supported the Centre Victoria RadioFest at Kyneton on Sunday 22 April, particularly the 'event team' volunteers who made it all happen on the day.

Undoubtedly radio enthusiasts in Victoria were long overdue to have this type of event and it showed by the smiles on the faces of the more than 550 who attended and enjoyed the great social atmosphere.

The commercial traders expressed the opinion that it was "Australia's best organised event", efficiently and professionally run.

The cooperative effort of Amateur Radio Victoria, Central Goldfields ARC and the Midland Amateur Radio Club was a key to its success, plus all of the participants who gave their support through talks, displays and events.

Gippsland Gate Radio & Electronics Club

AN INVITATION TO STALLHOLDERS

On 21st July 2007, the Club shall be conducting its annual HAMFEST SALE for the sale of new and used electronics and radio equipment. As per last year, the venue will be at the Cranbourne Community Hall on the corner of Clarendon and High Streets, Cranbourne. High Street is part of the Sth Gippsland Highway. Melway 133 K4.

40 tables will be available for stall holders, but demand will be high as usual. Please book early to avoid disappointment. Table hire will be $20 per table, and must be paid in full before the event. To make a booking, contact Dianne Jackson on (03) 5625 2545 or email hamfest@ggrec.org.au for further details.

The doors will open for buyers at 10 am with a $6.00 entry fee.

Each year, this sale is a great success with many hundreds of people through the door of our large Cranbourne venue making it a premier event for radio markets in this state.

Proceeds from the sale will help us to continue with the upgrading of facilities at our new GGREC Club Radio Shack and help promote amateur radio in the region.

News from...

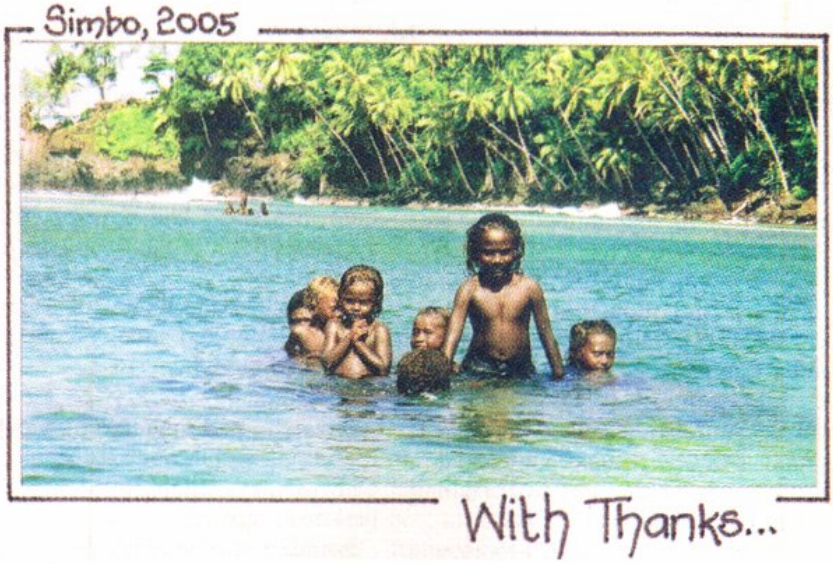
VK7

Justin Giles-Clark, VK7TW
Email: vk7tw@wia.org.au Regional Web Site: reast.asn.au

Solomon Islands Tsunami Appeal

Steve VK3JY mentioned the plight of the Simbo people following the tsunami on the Sewing Circle net (3.59 MHz 5 – 6 pm) and Don VK7AY, the net coordinator, took up the challenge and started an appeal to help these people. Steve's daughter is married to a Solomon Islander from Simbo whose family was seriously affected by this disaster. Of the three villages on the island, Tapurai was totally demolished and many people killed. Many VK3s, VK7s and others donated and $820.00 was transferred to Simbo to help them rebuild. Don was overwhelmed by the generosity of the radio amateur fraternity.

The feedback received is that the funds are being used to help re-build the local communities, re-establish their subsistence gardens and provide essential items like knives, water containers, lanterns and building tools. Don even received a thank you postcard.



VK7 – Third in the VK Callback Stakes

In the wrap-up of WIA National broadcast statistics, VK7 has come third behind VK4 and VK2 on a state-by-state basis. For the National broadcast year, VK7 recorded almost 5900 callbacks between 7 May 2006 and 29 April 2007. Thanks to all involved in bringing the WIA National and VK7 Regional News broadcasts to listeners in VK7. This is a great result for the WIA and VK7.

Further BPL trials in VK7

Trial BPL infrastructure is appearing around the South Hobart area including upper Davey and Macquarie Sts. These installations are using fibre back haul and BPL to the consumer. The South Hobart installation appears to be using the higher end of the HF bands with BPL emissions detected in the 13-32 MHz range. The amateur bands appear at this stage to be notched. More info can be found at: http://reast.asn.au/vk7bplwatch.php

North West Tasmanian Amateur Radio Interest Group

The VK7RAE NW propagation beacons are back in service at Don Heads. Beacons are available on 144.474 MHz and 50.057 MHz with the 70 cm beacon not operating at the moment. Any reception reports or questions can be directed via email: nwtarig@spamex.com or phone: 03 6425 2923. The ISSTV gateway at VK7AX has been reactivated with RF linking to the 6 m Repeater VK7RNW. The last 3 pictures received on the ISSTV Gate can be found at: http://www.vk7ax.tassie.net.au/sstv/

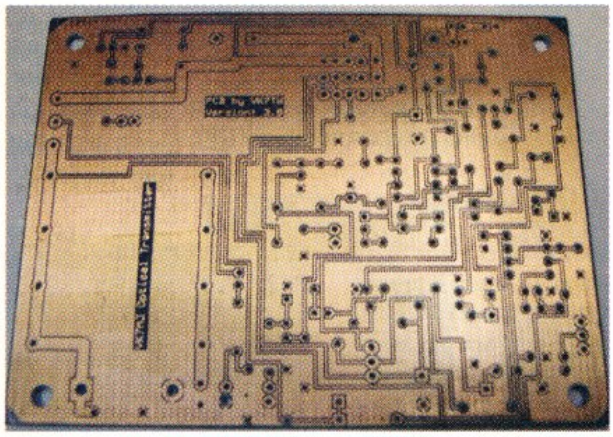
Northern Tasmania Amateur Radio Club

On the 17 April, Roger VK7ARN gave a great presentation on WICEN activities which stirred up some interest in WICEN in the North. The link between VK7RAA and VK7RWC has been installed via Companion Hill and is working well. Thanks to Dion VK7YBI, Graeme VK7AQ, Dick VK7DIK, Shane VK7ABB, Paul VK7KPG and Joe VK7JG.

News from...

Radio and Electronics Association of Southern Tasmania

We have had a great response to the Introduction to the Standard Licence sessions on Saturday afternoons from 1:00 to 4:00 pm in the Domain clubrooms. These sessions attempt to de-mystify the upgrading process. The REAST presentation on 2 May was given by the author and included practical sessions about PCBs from "Design to Drilling" using the ExpressPCB program and Press-n-Peel PCB transfer film.



One of the PCBs manufactured at the sessions.

VK5

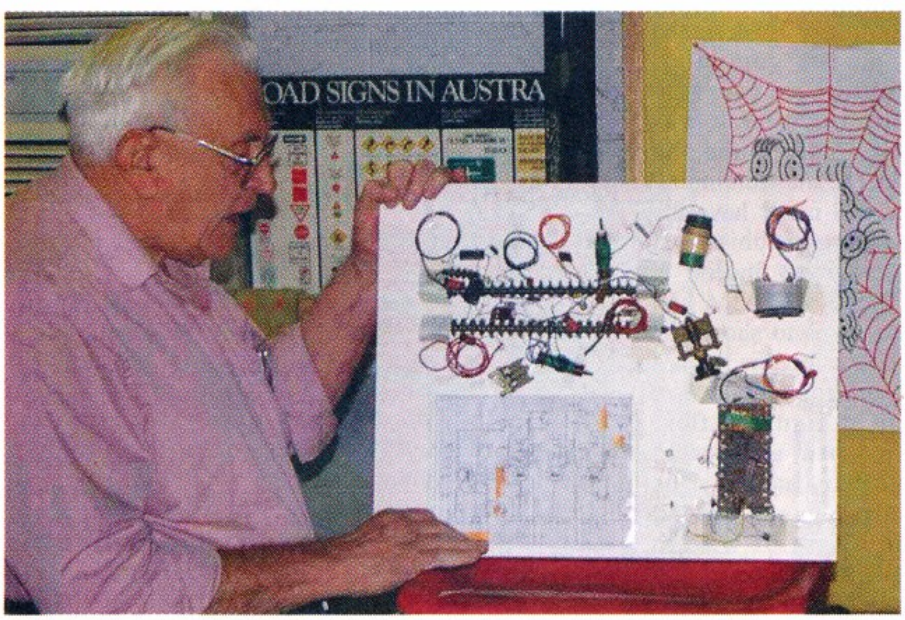
South Coast Amateur Radio Club – Latest News

Stef Daniels VK5HSX

Publicity Officer, Email: secretary@scarc.org.au

The South Coast Amateur Radio Club Inc. is coming up to 12 months since the move to its new home at the Hackham Scout Hall, which turned out to be a worthy exercise. We are in the process of finishing the radio and committee room, with cleaning, construction and further work still to be done. We are hoping to have things finalised by July, all going well.

Since the club took over the distribution of the VK5JST Antenna Analyser kits from the Elizabeth ARC, we have been receiving numerous orders for the kits through emails to kits@scarc.org.au or by visiting the SCARC website at www.scarc.org.au. The setup of payments via PayPal and by direct debit, has made things easier for purchasers.



Dennis Avard VK5OF/G3IEY with his "rat's nest" transmitter

The joint SCARC and Air-Stream wireless Wide Area Network (WAN) installation took place in March, which commenced the long awaited backbone over O'Halloran Hill, linking the City to the Southern Suburbs. We managed to place the WiFi antennas halfway up the mast, which was not the ideal place; however, current observations of the link seems to be better than expected. Special mention should go to Robert Hart and Paul Hoffman VK5PH and the other members of Air-stream, Steve Fraser VK5ASF, Arno Attema VK5ZAR (SAPUG), along with Barry Bates VK5KBJ, Geoff Madden VK5KMG, Peter Clarke VK5HPC and Stef Daniels VK5HSX from SCARC for their contributions in getting the system finally operational. For more information on the wireless system, you can visit the Air-Stream Website at www.air-stream.org which shows the full details of the network.

The March General Meeting saw a presentation by Dennis Avard VK5OF / G3IEY, who celebrated his 55th year

in amateur radio with the club. Dennis gave a brief talk, showing a time-line of some technological advances and where they fit in during his life. He also brought in his personal construction of a 'rats-nest' transistorized transmitter which he created in his early years of AR, in fact approximately 7 years after the transistor was first developed at the Bell Telephone Laboratory, which was mounted on board that travelled from the UK. The club congratulates Dennis on his achievements and the night ended with pizzas and social chit-chat.

SCARC regularly hosts assessment events. Those interested in sitting for Foundation or licence upgrades, please contact Barry VK5KBJ by email vk5kbj@internode.on.net

Next SCARC Meetings: Wednesday 27th June and 25th July, commencing at 8:00 pm at 16 Roberts Road, Hackham.

Adelaide Hills Amateur Radio Society

Christine Taylor VK5CTY

As is often the case, the Members' Show and Tell night this year was a particularly interesting one. The range and quality of the items shown varied from the simple to the very complex.

The aluminium sheet metal bender designed and built by Jim VK5JST was extraordinary. He had made the machine out of layers of common chipboard with steel plate hinges and cutting edges. The chipboard was used because it can be worked easily and takes screws in the "end grain" without damage. He modified the slot arrangement used to accommodate the size aluminium sheet being bent so that all lengths from 25mm to 420mm can be bent. As always with the work Jim does, it was finished beautifully. The bender will form an article in this magazine before long. The cost using new materials was $35 – considerably less than a commercial bender.

The next item was the linear amplifier on which Barry VK5ZBQ has been working for some time. He has used it seriously now and found it to be an instant start and absolutely linear amplifier. With less than 100 watts input, he gets a solid 400 watts PEP out. It is a credit to him.

Daryl VK5JDS also had an amplifier to show. This was an audio amplifier with which he has been experimenting for some time. It used one of several Drew Diamond circuits. He reports that it works very well.

Daryl was followed by Rob VK5GR with more of his junk box/recycled items. This time he showed an old but special valve that had stopped working. After carefully taking it to pieces he found several dry joints in the base. It now is available for use again. He had a Collins ceramic filter around which he built a filter stage for a receiver. He tested it out in a receiver built so that different sections can be replaced so it is not necessary to start from scratch when a new unit is to be tested. Over the years this receiver has had a number of configurations.

Keith VK5OQ faced a common problem in his shack when he retired. He had a mass of wires from transceivers to antennas twisted together. He has now built an antenna tuner into which several different antennas and several different transmitters can be connected and used. The mess of wire is considerably reduced. Keith used an interesting technique to make up his front panel. He designed it on the computer, printed it on pale blue card and after it was laminated, glued the panel to the aluminium. He will never have the markings rubbing off under greasy fingers!

Steve VK5AIM had two items to show and tell. He had made up a dipole for mobile use, out of figure 8 flex, 'unzipped' and wound into two matching sized coils. You can unwind the length of wire to match the frequency you want to use and with a small balun and ladder

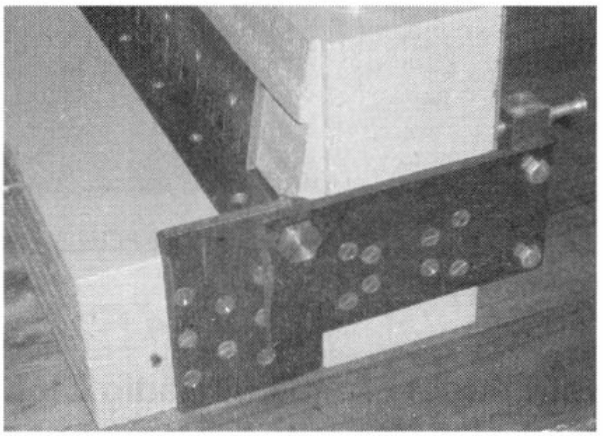


Photo 1: Aluminium sheet metal bender designed and built by Jim VK5JST

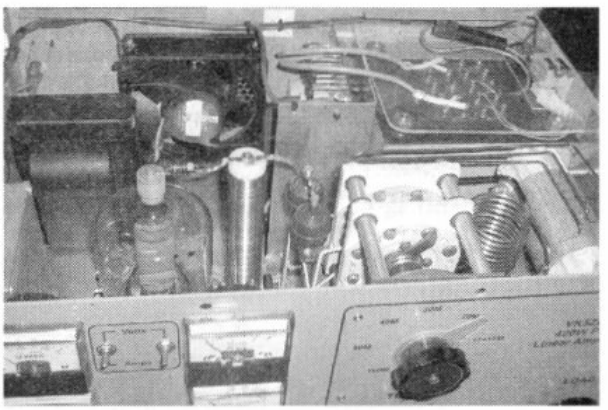


Photo 2: Barry VK5ZBQ constructed this linear amplifier

Photo 3: Audio amplifier by Daryl VK5JDS

line you are quickly set up for operating in the field. The other item was a simple transmitter made up as a demonstration piece for AOCP classes. Each stage was set up on its own piece of printed circuit board. The stages were connected together by clearly visible lengths of wire. Instead of having just a row of block diagrams to represent the stages of a transmitter, the students could see each stage separately. A clever and simple idea.

Horst VK5ZLW had made up an audible SWR bridge. This was a Drew Diamond circuit and, while it is not as accurate as a metered SWR bridge it is suitable for a visually impaired operator and can help to make them independent. Horst installed a LED indicator a day or so before the meeting when he realised the battery was flat. For a visually able operator this is definitely considered to be a good idea.

The last two members have different problems and have addressed them to suit their needs. Lyall VK5ZNB has an XYL who does not want any antennas to be visible, so Lyall has a 20 metre aerial inside his roof space and an 80 metre one mounted along the ridgepole of the house. Black wires, black tiled roof and short black stand-up insulators to support the wire make it almost invisible. However, Lyall wanted to try something more efficient on 80-meters, so he made up one of the cross-linked designs of Lloyd VK5BR. On first attempt it didn't work well when it was mounted on a galvanised iron fence, but for the next attempt it will be mounted on the house (secretly at night), away from the fence.

Dean VK5LB has acreage so has no problem with erecting beams etc. However he has built the Z match to

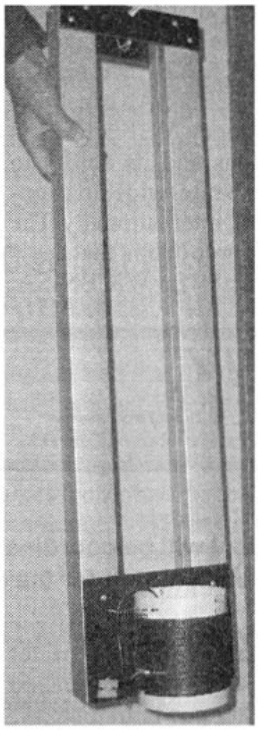


Photo 8: Compact "hidden" antenna for 20 metres by Lyall VK5ZNB

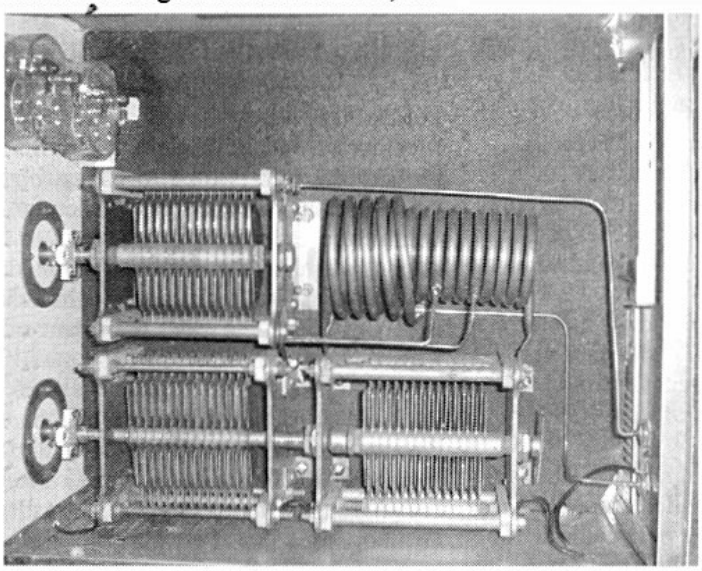


Photo 9: Z match "ATU" by Dean VK5LB

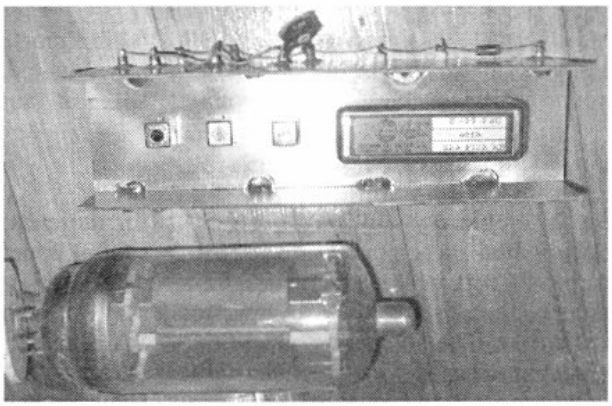


Photo 4: Junk box/recycled items from Rob VK5GR

Photo 5: An antenna tuner built by Keith VK5OQ

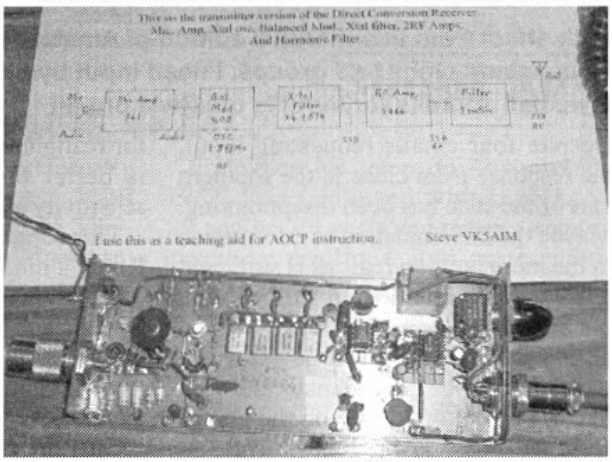


Photo 6: A simple demonstration transmitter for AOCP classes by Steve VK5AIM

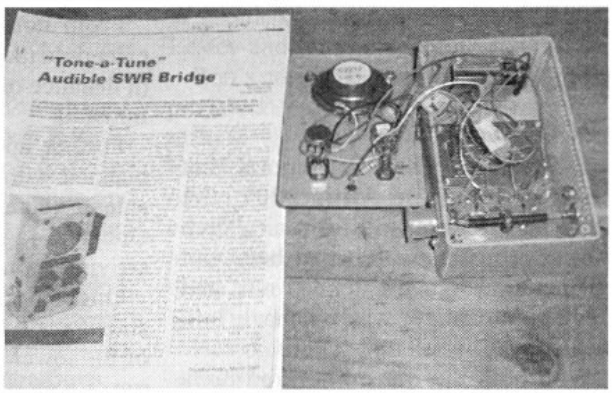


Photo 7: An audible SWR bridge by Horst VK5ZLW

end all Z matches. It is a Lloyd VK5BR designed single coil type but the coils are wound out of the largest diameter copper tubing most of us will ever see. Dean has mounted it in a computer case with space at the top for several switching units. The front panel has just a meter and two tuning knobs.

Altogether a most interesting and versatile display.

Dr Hank Prunckun VK5JAZ

VK5 WICEN News

On 28 February 2007 WICEN-SA participated in a workshop on radio communications in the wake of a catastrophic event, such as a major earthquake. The South Australian State Response Advisory Group convened the workshop of all emergency and functional services, police, and ambulance service at the State Emergency Centre in Adelaide. A presentation of the Government Radio Network (GRN) and the state's Information and Communications Technology (ICT) infrastructure was presented to the participants as the context for the ensuing panel discussion. The central issue to emerge was the pivotal role wireless communications would play in such an event. The WICEN-SA representatives at the workshop, Director Ian Clayton VK5AIC and Dr Hank Prunckun VK5JAZ, then briefed the assembly on WICEN-SA's capability to establish emergency VHF/UHF and HF communications and its ability to handle messages state-wide, nation-wide, and if needed, internationally. The main point to emerge from the day's discussion, specifically for WICEN-SA, was that the scale and magnitude of such a disaster would require WICEN-SA to be able to mount a sustained field operation and have its message handling practices and procedures well honed. These issues were reported back to the WICEN-SA's Executive Committee for future planning. There may be some merit in other VK-WICEN associations noting these outcomes as the impact of a catastrophic event might have similar consequences for a WICEN activation/ deployment in their jurisdiction.

QTC VK4

First Published July 1927 "Of, By and For the Amateur"

News from/for Queensland Radio Amateurs

J R "Rossco" Anderson VK4AQ

With effect from this month's edition of Amateur Radio, I will be coordinating the VK4 column on behalf of Queensland clubs and groups. I need input by 6th of each month for the subsequent monthly edition of AR. My email address for input is qtc@wia.org.au

Despite four emails requesting input, the response from clubs in the southern part of the state has been disappointing. Maybe the dissemination of information in the more built up regions is sufficient not to rate a mention in this column but remember folks, we have a good percentage of amateurs who now consider themselves to be grey nomads and who like to be kept up to date on the goings on in the areas in which they travel.

I hope to receive a much larger input from groups in the central and southern parts of the state for next month.

VK4RBK repeater recommissioned

Jeff Cochran, VK4BOF reports that on Wednesday 26 April 2007, the Tablelands Radio and Electronics Club 70 cm repeater, which had been out of operation for an extended refit and frequency change, was put back into service.

With both the transmitter and units having been sent to Tait in Brisbane for realignment, the VK4RBK repeater is better than ever, with increased sensitivity and better power output.

The repeater is located at Bones Knob, a hill overlooking the townships of Atherton and Tolga in Tropical North Queensland. Please note that the new frequency is now 439.900 MHz with a -5 MHz split. (Previously VK4RBK was on 439.500 MHz)

Current reliable mobile coverage includes the Atherton, Tolga, Kairi, Malanda and Mareeba districts.

From home stations, the coverage extends to the northern beaches of Cairns (a distance of over 60 km) and south to Innisfail.

Further updates for the repeater are planned with a new 6 dB gain vertical antenna (already purchased from Mobile One) and 15 metres of LDF4-50 Heliax arriving soon.

Once the Heliax arrives, the new antenna will be installed at the very top of the tower and the new cable will be run. VK4RBK will then be changed to the new antenna and we expect coverage to be improved by a considerable amount.

The repeater was recommissioned by John VK4TL and Jeff VK4BOF with assistance from John Stevens at Tait Brisbane.

Darling Downs Radio Club

Darling Downs Radio Club will be conducting their Annual General Meeting at 1900 on 23 July at the SES Headquarters. It is time to be putting your hand up for positions on the club committee especially given the very strong calendar of events programmed for the year. A good roll up of members is requested to this most important of yearly events.

The Club also reports that the BBS Packet run by Martin VK4HMD has died an "unnatural death" due to lack of interest in the Toowoomba area.

Congratulations to Graham Hassall! Graham took the Foundation exam just a few months ago and has now

successfully passed the Standard exam. He now proudly boasts the callsign VK4HZX. Well done Graham!

Everyone in the club extends a hearty get well to Secretary Theo VK4ESK and to Eric VK4ECT, both of whom underwent surgery recently.

Tablelands Radio Group

Mike VK4MIK reports that preparations for the International Lighthouse and Lightship Weekend at Cooktown in August are well advanced and all necessary approvals have been received. The callsign VK4GHL (Grassy Hill Lighthouse, where the Cooktown light is situated) has been granted and will be much sought after again this year. A monster breakfast, organised by Dennis VK4JDJ and Rossco VK4AQ is being arranged for the Sunday morning.

The number of operators responding to the club's Invitation to Participate has just about reached capacity for this year Mike says.

Townsville Amateur Radio Club Inc

The Far North and North Queensland Amateur Radio Get Together (FNNQARG) will be conducted from 8th through 11th June at the Cardwell Village Beachcomber Motel and Tourist Park.

Demonstrations of ARDF, World Championship Antenna Wrestling, NAVCOM Electronics display of Icom, Yaesu and Diamond equipment, the famous Sunday morning cricket match and much more has been scheduled for this very relaxing and fun-filled weekend. Not to forget the Monster Trailer Auction Sale so eagerly awaited each year.

Amongst those attending will be Mr Aoki, Managing Director of Icom Australia, and Mr Yoshi, Managing Director of Standard Vertex Australia (Yaesu). Rumour has it that they are already in training for the cricket match again this year. Mr Aoki's prowess as a baseballer shone through in last year's event.

Accommodation can be arranged by calling Toni or Bruce at the Beachcomber Motel on 1800 005 633. This will be a very good opportunity for those of you in the cooler climes to visit the Far North for some good old hospitality, amateur radio camaraderie and warm weather.

North Queensland Amateur Radio Convention

This very important two-yearly event has been convened for 21st through 23rd September in the twin cities of Thuringowa and Townsville. For an electronic copy of the Venue and Events program, please send a message to vk4wit@wia.org.au

Central Highlands Amateur Radio Club

President Mark Robinson VK4KMR has advised that the new IRLP node has just been activated in Dysart, Central Queensland.

Node 6037 will shortly give IRLP users complete access to the central highlands VHF solar powered linked repeater system sites near Clermont, Blackdown and Springsure, as well as UHF repeaters at Rockhampton and Sarina.

Mark would like to thank Steven VK4SMW and Rob VK4HW for their help in building the Linux IRLP 6037 server and setting up control programs and scripts.

Mark is confident this additional access will bring members of CHARC closer together, as well as the wider community of amateurs, with events that happen during the year.

Learn more about CHARC at http://au.groups.yahoo.com/group/charc/

For the keen angler

Those amateurs with a keen bent for fishing would be well advised to visit the site run by Lyn VK4SWE, who, with OM Tex, lives on Sweers Island in the Gulf of Carpentaria. There is a marvellous assortment of fishing pictures available and a number of recipes for download that pass the taste test hands down. Lyn's website is at www.sweers.com.au

ar

Silent key

CJ "Ron" Petrich MBE VK4ACZ

It is with deep regret that I report the very sad passing of C. J. "Ron" Petrich MBE VK4ACZ on Monday, 23 April 2007. His funeral took place in the Mossman, NQ, lawn cemetery on Monday 30 April, following a service at St David's Anglican Church.

Ron was born in Gundagai, NSW, in 1922 and did his schooling at his birthplace and in Tumut. He was trained in radio prior to joining the RAAF in 1941 as soon as he met the age requirement. Ron served in New Guinea and was "demobbed" as a Pilot Officer in 1945.

Flying and radio were in Ron's blood. For a number of years he was a Radio Operator with QANTAS in converted Lancastrians, DC4s, Sunderlands and Constellations on the Sydney/London and Sydney/Tokyo routes.

Ron was posted to Singapore in 1953, where, after the then world's worst airline disaster, he was awarded an MBE for bravery during rescue operations.

Following his return to Australia in 1957, Ron continued with QANTAS for another 20 years and reached senior executive positions. Ron represented Australia on the two major international aviation bodies of IATA and ICAO for a number of years until, at age 54, decided it was time to retire to God's own country — Queensland.

Ron's first wife, Gwen, also an amateur, passed away in 1992 and he is survived by his present wife of 13 years, Winsome and children Jim, Jennifer and Lesley and four grandchildren.

Ron's commitment to community, his preparedness to lead when necessary and to do that by example, is legendary in the Far North Queensland region. His legacy of fairness, trust, loyalty and honour combined with his steadfast belief in a supreme being is a shining light for those who have had the honour to call him "my friend."

Ron epitomized all that is decent in a human being.

J R "Rossco" Anderson VK4AQ

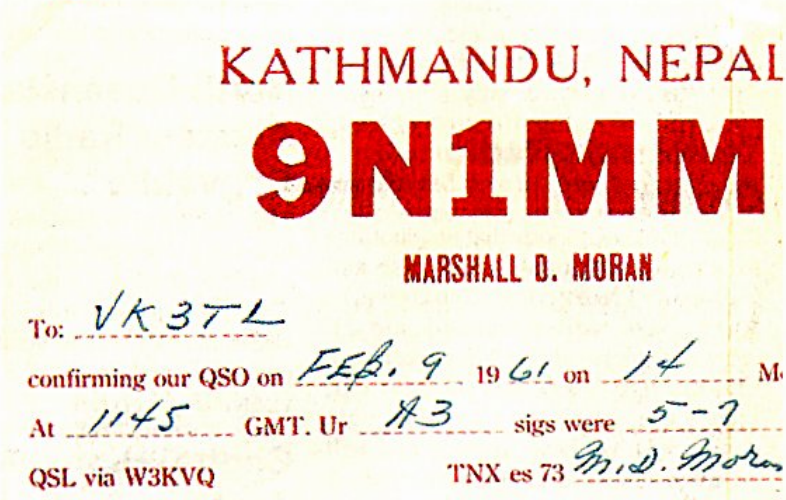
QSL Cards from the WIA National QSL Collection

Ken Matchett VK3TL, Hon. Curator:
wiaqslcollection@wia.org.au

An SOS out of the night

A nice batch of choice DX QSLs from one of our top DX-ers and contributors, Jeff VK6AJ. Jeff uses Yaesu equipment and a 6 element log periodic, which he says is useful for moving from band to band. He also has a 40 metre inverted V antenna. One of the QSLs sent included 9N7DX by an Israeli DXpedition to Nepal. Before listing some of the f.b. QSLs let me digress a moment to tell you a little story about Nepal.

It was in the 1960s when I came home from an evening out, and although it was after midnight, I switched on the rig just to see if something rare might be on the bands. (I was a very keen DX-er in those days, and, with my cubical quad up 70 ft. (approx 21 m) on high ground in Templestowe, I was ever so keen to add just a few more remaining countries in order to reach the magical DXCC 300.) Well I didn't have long to wait before I heard a Morse signal from Nepal. At that time there was virtually only one amateur radio station in that country and that was 9N1MM (9N1 'mickey mouse') operated by the late Father Moran, principal of the High School in Kathmandu. He was a very well-liked person,


KATHMANDU, NEPAL

9N1MM

MARSHALL D. MORAN

To: VK3TL

confirming our QSO on FEB. 9 1961 on 14 M

At 1145 GMT. Ur 43 sigs were 5-7

QSL via W3KVQ TNX es 73 M. D. Moran

One of Father Moran's QSL cards sent to Ken in the early 1960s.

and his call was widely known throughout the world of DX. (Even the expeditionist Gus Browning W4BPD couldn't keep out of the limelight and borrowed his call-sign during his 1963 DXpedition to Asia.) But the

continued on page 44

Phil Smeaton VK2BAA

Contest Calendar June - August 2007

June	9/10	**ANARTS WW RTTY Contest**	**Digital**
	9	Portugal Day DX Contest	SSB
	9	Asia-Pacific Sprint Contest	SSB
	16/17	All Asian DX Contest	CW
	23/24	Marconi Memorial HF Contest	CW
July	1	Canada Day Contest	CW/SSB
	7	**VK/trans-Tasman 160 Metres Phone Contest**	**SSB**
	14/15	IARU HF World Championship	CW/SSB
	21/22	CQWW VHF Contest	All modes
	14	**Jack Files Memorial Contest**	**CW/SSB**
	21	**VK/trans-Tasman 160 Metres CW Contest**	**CW**
	28	Waitakere (NZART) Sprint	SSB
Aug	4	QRP Day Contest	**CW/SSB/FM/PSK31**
	4	TARA Grid Dip	**PSK/RTTY**
	4	Waitakere (NZART) Sprint	CW
	4/5	10-10 Intl QSO Party	SSB
	11/12	**Remembrance Day Contest**	**CW/SSB/FM**
	25/26	Keymen's Club of Japan Contest	CW
	25/26	**ALARA Contest**	**CW/SSB**

Welcome to this month's Contesting Column.
A somewhat diminished offering this month due to pressures of life....

Contesting – Manx Style

I thought that it might be interesting to look at how contesting on the Isle of Man is done. The Isle of Man is in the Irish Sea between the UK and Ireland and is generally more famous for being the host of the annual TT motorcycle races.

It is home to about 70,000 people. The prefix for the island is 'GD' or 'MD', the sub-prefix of 'D' denoting the island.

There are a few contesters on the island with a myriad of interests including HF and VHF contesting, with EME (earth-moon-earth or moonbounce) also featuring but more likely on 6 m nowadays as the only large 2 m array for EME that I'm aware of on the island is currently undergoing repairs. The salt air and the ravages of the weather take their toll on even the hardiest of structures.

Probably one of the more active groups entering contests from the island is the Manx Kippers (also known as The Northern Lights) consisting of a mixture of islanders and enthusiastic amateurs from the UK. Callsigns used include MD4K, GD0EMG and MD6V. Members of the group currently consist of: Andy GD0TEP, Robert GD4GNH, Don G1GEY, Martin G4XUM, Dave G3NKC, Peter G4MJS, Tim M0BEW and me as my UK call G0HSS. Other operators such as Ian G0AFH and Chris G0FDZ join the group for the European UHF (and up) contest every year, at the beginning of May.

Some of the equipment is stored permanently on the island but each trip from the UK requires various items from the owner's home station, such as rigs, ATUs, power supplies, amplifiers, computersand the like, to be transported to the island for contest. This equipment is too heavy for transportation by air (unless someone with a generous nature and a blank cheque book is available), so sea travel from Heysham on the UK northwest coast to the port of Douglas is required to get all of the gear in the right place. The trip takes around 4 or 5 hours in good weather (which does occasionally happen on the Irish Sea) and allows operators to gain some much needed sleep as the majority of time spent on the island will be utilised in setting up, operating and then stripping-down and storing the station equipment again. Not much time for tourist activities!

Setting-up requires the antennae supports and antennae themselves to be removed from the barn of Robert GD4GNH and assembled. All HF antennae are erected specifically for the relevant contests and are dismantled again afterwards, with only the 23 cm and 70 cm antennae being a permanent feature at Robert's station for VHF/UHF activities. Chris G0FDZ supplies the 'wok' and tripod for 10 GHz, along with his homebrew transverter from 2 m to 3 cm. For VHF, I supplied the homebrew 2 m amplifier (featuring a single GS35b triode) and for UHF I supplied the whole station comprising an FT1000MP transceiver, homebrew 70 cm transverter and homebrew 70 cm amplifier, also featuring a single GS35b triode. Masts include two mobile trailer towers and a mind boggling array of scaffold pipe and rope. Masthead preamplifiers and change-over relays were also supplied by team members and are essential for weak signal working. The change-over relays are of specific importance, as they provide isolation from transmit and receive coax, in order to protect the preamp active device from damage due to high levels of RF.

The group usually assembles for a selection of contests throughout the year, including: CQWW (as a Multi-Multi entry), CQWPX (as a Multi 2 entry), May UHF, Region 1 Field day, ARRL 160 and CQ160.

A similar array of equipment is used when the group goes 'portable' for a contest, which makes for a large amount of work for a generally small group (usually only a hardy few for the HF portable contests).

So, what can be expected when operating from GD? Band conditions tend to be just as variable as in the antipodes, but the proximity to mainland Europe generally makes for QSOs on HF but not necessarily always on VHF/UHF. Dependent upon sunspot activity of course, openings to Japan on 15 m and 10 m occur, but the openings tend to be of a fairly short duration around the time of Region 1 Field Day in early September, so frequency agility and frequent visits to the bands are required throughout the contest – remembering that the beam headings are different from GD to those from VK! This sounds obvious, but can easily be forgotten at 2 am when tiredness creeps in.

VHU/UHF openings are not to be underestimated on occasions, as ducting can occur between the island and mainland Europe, producing some spectacular signals into nearby countries but also Spain, Italy, Portugal and Russia on 144 MHz and upwards. I've been operating on 70 cm and have gone outside of the shack to see if someone was winding me up with a local rig as the signals have been so strong!

MD4K and GD0EMG have been successful in all manner of HF, VHF and UHF contests, with an array of awards to their name. The prefix certainly adds a few dB to the signal at times as stations from GD are not so common on the bands. The team goes from strength to strength, so if you hear them on HF (it would take quite a lift to hear them on VHF that's for sure – unless on EME) give them a shout. They are active on 6 m EME too, mainly via Andy GD0TEP. Andy has an interesting selection of QSL cards available so it's worth a QSO just for that!

Due to space limitations in *AR*, take a visit to the MD4K website at www.md4k.com or www.gd0tep.com for pictures of equipment used.

Band	Antenna	Comments
10 m	5 ele Monobander (Vine 105)	
15 m	5 ele Monobander (Force 12 EF515X)	
20 m	4 ele Monobander (Force 12 EF420)	
40 m	2 ele Monobander (Cushcraft 402CD)	
	4 Square	
	Butternut HF2V	
80 m	Dipole	Vertical also used
	Butternut HF2V	K9AY also used
160 m	Dipole	K9AY also used
	Inverted 'L'	Beverages also used
	Balloon Supported Vertical	

Table 1 Antennae used by the Isle of Man Contest Group MD4K

Contesting Basics 101 – Part 2

Following on from last month's general overview of contesting, this month we take a look at scoring and entry categories.

What makes a Winner?

The winner in each category of the contest is determined by the highest scoring station within a given category. Points are scored for each QSO, generally if the station has not been contacted before on that band. I say generally, as some VK domestic contests permit 'repeat' QSOs after a given period since the previous QSO.

Each contest has its own scoring system, so the exact number of points will vary from contest to contest. It is worth studying the rules for the contest that you wish to enter prior to commencement, to familiarise yourself with the scoring system and make a plan for maximising your score.

The points awarded for a given QSO might depend upon the location of the station as, for example, during CQWW DX contest the points awarded depend upon the station's location as regards continent – 1 point for a QSO with a station in the same continent as yourself and 3 points for a QSO with a station located within a different continent from your own. Stations located within the USA work each other for 2 points per QSO.

Other contests have scoring that promote QSOs with particular stations, such as Foundation licensees or even for a given mode.

Multipliers

As well as getting points for each QSO, most contests allow you to get multipliers from certain QSOs. For example, you might get a multiplier for every different country you work on each band during the contest. Your final score for the contact will then be calculated by multiplying the total of all your QSO points by the number of multipliers you worked. A few examples:

In the CQ Worldwide DX contest, countries (DXCC entities) and CQ zones both count as multipliers. So if you work 100 countries in 20 zones, you would have a total of 100 + 20 = 120 multipliers. In the IARU HF World Championships, ITU zones and IARU member society headquarter stations and IARU officials worked count as multipliers. In the ARRL International DX Contest, for stations in North America each country worked is a multiplier. For stations located outside North America, every American or Canadian state worked is a multiplier.

DXCC Entities correspond roughly to countries and territories, but they also may be islands and even reefs if they meet criteria set by the ARRL, which administers the DX Century Club (DXCC) award and decides what qualifies as an "entity" or the RSGB IOTA (Islands On The Air) Committee which administers the IOTA Contest.

The world is divided into 40 "CQ Zones" which are used as multipliers for some contests. Get further information and a map showing the different zones at www.cq-amateur-radio.com/wazmain.html.

Next month, the final part of Contesting Basics 101 takes a look at who can be worked in a contest and how often.

If you have any contest related material for inclusion within the column, topics that you'd like covered or even some experiences and pictures you'd like to share, then please feel free to get in touch via vk2baa@wia.org.au. See you on the bands.

73 de VK2BAA Phil Smeaton

Jack Files Contest Rules 2007

from John Spooner K4AJS,
Contest Manager

This contest is in honour of the late Jack Files, a long-serving VK4 WIA councillor. It is coordinated by the Queensland Advisory Committee and is sponsored by the WIA.

Since the formation of a National WIA, it has been decided to make this contest a national remembrance of an amateur who gave long service not only to benefit Queensland amateurs but to have been an asset to all amateurs within Australia. The object is to work as many different stations in different Queensland shires and towns for the purpose of multipliers but in addition to this all participants will be able to count the first of each VK state or territory worked in each one hour block of the contest as a multiplier. Also provision will be made for the working of the same station within the same one hour block if one or both of the stations are mobile and are passing through different shires, towns, states or territories (simplified if you wish to operate as a mobile or portable station and you cross over to another shire you may work any station that you have already worked in that one hour block again). It is very important that VK4 stations give their shire codes with the report and number given. An example is an amateur in Livingstone shire would give out 59001LV. Shire Codes will be published and are available from the contest manager.

Object is for amateurs to work as many other amateur stations, and particularly as many different VK4 shires, towns and as many different states and territories as possible within each one hour block of the contest.

Date: Saturday, 14th of July, 2007

Time: 0800 UTC – 1400 UTC in six one-hour blocks for the purpose of duplicate contacts.

Band: 80 metres only. Use 3.5 MHz – 3.7 MHz to put all licence grades on an equal footing.

Modes: Either CW, SSB or All Modes

Categories: Single Operator; Club Station (each category can be a mobile or portable station)

Exchange: Non-VK4 stations will send RS(T) plus serial number starting at 001 and incrementing by one for each contact. VK4 stations will send RS(T), serial number and two-letter shire or town code for purposes of multipliers.

Score: One point per contact

Multipliers: Each VK4 Shire or Town counts as a multiplier only once over the entire duration of the contest. All participants may also count the first contact in each state or territory as a multiplier and these may be counted within each hour block during the contest.

Final Score is total QSO points X total number of multipliers.

Repeat Contacts: In order to make best use of the band, stations may be contacted once in each hour on each mode. Repeat contacts with stations may be counted within the same one hour block only if the station is mobile and crosses from different shires, towns, states or territories to another. All repeat contacts must not be consecutive.

Logs must show full details of all QSOs and must be accompanied by a Summary Sheet showing operator's name; address; callsign; category and mode entered; claimed score and a declaration that the rules and spirit of the contest were observed.

Send logs by mail to Jack Files Contest Manager, 26 Kerr St. Park Avenue Nth. Rockhampton QLD 4701. Logs may be sent by e-mail in text format to: vk4ajs@wia.org.au

Closing date for all entries is 31st of August, 2007

Certificates will be awarded to the top scorers in each mode in each VK State, ZL, P29 and any DX country (i.e. country outside VK, ZL or P29). As well there will be a certificate awarded to the overall highest scorer who will be declared overall contest winner. The only stipulation is that the overall winning operator must be a VK amateur.

Please feel free to email me and request an example log to assist in working out your final score.

JIDX 2006 Phone Result

Australia

Many congratulations to the following stations for a superb effor in the contest and for flying the flag for VK!

VK4BUI	AB	19264
VK3AVV	AB	1976
VK4NEF	ABL	39312
VK4FJ	ABL	1044
VK6ANC	Mop	38016

VK4 City/town/shire Codes

AC Aramac; AN Arakun (R); AT Atherton;

BA Banana; BB Badu Island; BC Barcaldine; BD Bendemere; BE Burnett; BF Boigu Island; BG Biggenden; BH Bauhinia; BI Bungil; BJ Bamaga; BK Burdekin; BL Balonne; BN Brisbane; BO Barcoo; BP Bulloo; BQ Booringa; BR Burke; BS Broadsound; BT Beaudesert; BU Bundaberg; BV Boonah; BW Bowen; BX Blackall; BY Belyando; BZ Boulia.

CA Caloundra; CB Caboolture; CD Cardwell; CF Clifton; CG Cherbourg; CH Chinchilla;

CK Cook; CL Calliope; CM Cambooya; CN Crows Nest; CO CooloolaCP Carpentaria; CR Croyden; CS Cairns; CT Charters Towers; CY Cloncurry;

DA Dauan Island; DG Douglas; DI Diamantina; DL Dalrymple; DO Doomagee; DU Duringa; DY Dalby;

EA Eacham; ED Eidsvold; EK Esk; EM Emerald;ER Erub Island; ET Etheridge.

FL Flinders; FZ Fitzroy.

GA Gatton; GC Gold Coast; GD Gladstone GH Gayndah; GI Goondiwindi

HA Hammond Island; HB Hervey Bay; HK Hinchinbrook; HT Herberton; HV Hope Vale.

IA Iama; IC Infracombe; IF Isisford; IJ Injinoo; IN Inglewood; IP Ipswich; IS Isis

JE Jericho; JO Johnstone; JY Jondaryan.

KC Kilcoy; KG Kingaroy; KK Kilkivan; KO Kolan; KU Kubin Igland; KY Kowanyama Island.

LA Laidley; LC Logan; LH Lockhart River; LO Longreach; LV Livingstone.

MA Mareeba; MB Maryborough; MC Mackay; MD Mabuiag Island; ME Mer Island; MG Mornington; MH Murweh; MI Mt. Isa; MK McKinlay;

ML Milmerran; MM Mt. Morgan; MN Mirani; MO Mapoon; MR Maroochy; MT Monto;

MU Mundubbera; MV Miriam Vale; MX Murilla; MY Murgon.

NA Napranum; NE Nebo; NN Nanango; NO Noosa; NP New Mapoon.

PA Paroo; PD Peak Downs; PL Palm Island; PO Pormpuraaw; PR Pine River; PT Pittsworth; PU Poruma; PY Perry.

QL Quilpie.

RC Redcliffe; RD Redland; RH Rockhampton; RI Richnmond; RM Roma; RO Rosalie.

SA Sarina; SB Saibai Island; SE Seisia Island; SP St. Pauls Island; ST Stanhope.

TA Tara; TB Tambo; TE Torres; TG Thuringowa; TI Tiaro; TM Taroom; TY Townsville; TW Toowoomba.

UG Ugar Island; UM Umagico.

WA Warwick; WB Warraber; WC Woocoo; WD Wondai; WG Waggamba; WH Whitsunday;

WI Winton; WO Wambo; WR Warroo; WU wujal Wujal.

YA Yarrabah; YO Yolke Island.

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QSL Cards from the WIA National QSL Collection *continued*

signal I was hearing was not coming from Father Moran. It was a distress call from Mount Everest. The story was that one of the native porters at a staging camp up the mountain had been severely burnt and needed hospitalisation. The operator, due to the vagaries of 'skip', could get his signal through to Melbourne but not to Kathmandu. But what could I do? It was one o'clock in the middle of the night. I reached for the telephone book to check the number of the Nepalese Embassy or Consulate in Melbourne, but there was not one listed.

Canberra was not much help either. Suddenly one word came to mind: Reuter's communication throughout the world. I contacted them in Sydney and told them of the misfortune of the expedition, and that was the end of the matter as far as I was concerned.

Well, not quite. About a couple of months later I was sitting down to my evening meal when my wife came hurrying into the dining room with the news that a woman was on the phone, wanting to know whether I was the owner of an amateur radio station called VK3TL. Well I was, wasn't I? What was the problem? Perhaps TVI, but no, it couldn't be. But I had no need to worry. I was speaking to a lady who had been in communication with her daughter who was working overseas. Actually she was a nurse at the Kathmandu General Hospital. (What a small world it is!) She was aware of the hospitalisation of the injured porter and had read details of an amateur radio transmission between the expedition and Melbourne from a bulletin board at the hospital. She thought that her mother might be able to contact me. She was able to find out my contact number and to relay the good news from Kathmandu. So when I am sorting through incoming QSLs and come across an 9NIMM QSL card my mind goes back to that lonely night so long ago when, through our wonderful hobby of amateur radio, the distance to Mount Everest from Melbourne didn't seem so far after all.

And now for comment on some of Jeff's other interesting QSLs. Poland HF1EU (commemorates Poland's entry into the EU) and HF7IARU (75 years of the PZK). ZL70AGY, South Africa ZS75 (75 years of Pretoria ARC). Maldives 8Q7VR. Japanese Antarctic Station 8J1RL (46th expedition 2005). Croatia 9A80AAA (80th Anniversary Zagreb ARC). Vietnam 3W8A and XV2G (IOTA AS130). Cambodia XU7GAX. Iraq YI9LZ (rare and a f.b. pictorial). Bulgaria LZ1195IR (St John of Rila in the year 1195). Poland SPOTPAX (TPAX was the earliest Polish amateur call dated 1925) and SR25JP (Pope John Paul II Silver Jubilee). HE3RSI (the prefix might indicate a station in Lichtenstein or perhaps a Swiss SWL but it is a special Swiss prefix celebrating Swiss Radio International).

Footnote:

Father Moran was born in Chicago. Much of his work was carried out in India as well as in Nepal and he was a great friend of both Gandhi and Nehru. A very fine radio operator, he assisted with radio links for Sir Edmund Hillary during the Mount Everest expedition of 1955. He passed away on 14 April 1992 at the age of 85 years. Although he died in New Delhi after a brief illness, his ashes were returned to Kathmandu. A radio museum containing his equipment and QSL cards has, I believe, been set up in Kathmandu to commemorate his contribution to amateur radio.

More acknowledgements next month. Keep those QSLs coming in.

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Christine Taylor VK5CTY

Some reminders

Keep recording those YL contacts towards the CLARA 40th anniversary. Certificates will be sent out for 40 YL contacts. All modes, all frequencies. Names, callsigns and dates. Enjoy!

Make plans for next year. The ALARAMEET in Tasmania and the International YL Meet in South Africa both in September make the choice difficult.

The ALARA Contest follows hard on the heels of the RD Contest. Try them if you have never tried a Contest before.

A Mini Hamfest over Easter in VK5

There were seventeen people at the shack called Womberoo, somewhere near Swan Reach in South Australia, at some time over Easter this year. All bar one were radio amateurs. Is this a record?

There were ten OMs and seven YLs altogether, though not all at the same time.

A great time was had by all. Some amateur radio was discussed and practised with a Vee-beam connected up at last. Four contacts were made on 20-metres on Sunday and on Monday afternoon two YLs joined the 14.220 Net.

Those regular Nets

There are always some ZLs and sometimes DX YLs from further away, on the Monday 14.222 MHz net from 0530 Zulu to about 0630 Zulu– with some call-ins earlier than that. Have a listen out and join in if you can.

On Monday nights, from 1030 Zulu there is a regular 80 metre Net for those in the Eastern States and a slightly later Net in VK6. Propagation does not often allow us all to be on the one net.

There are 2-metre nets in both VK4 and VK6. Check with your State Reps for times. VK5 has just started a 2-metre net on alternate Wednesdays at 8.00 local time on 147.000 repeater.

These 2-metre nets are good for some of the Foundation call people who do not have any HF rigs or are shy of being heard Australia wide. My spies tell me that there are eavesdroppers sometimes, cheering because the 'newbies' are having a go.

The Traveller's Net

This is not a YL net, but is an important lifeline for those travelling around Australia. It is certainly worth a listen. You hear about interesting places and you hear a very efficiently run net. The main net is on 20-metres starting at 1200 EST, but there is another net on 10 metres which was set up when those with a Novice licence were not allowed on 20 metres.

If you are travelling yourself, call in and let someone know where you are and where you are going. One day you may need help, which can only be available if someone knows where you are.

You could also find that there are other amateurs heading in the same direction as you are and this could allow you to meet. It could be the beginning of another long distance amateur friendship.

Amateur radio is a great hobby and one that allows us to meet on air or occasionally for an eyeball, and gives us friends for life.

ALARA sponsorship

ALARA has a system of sponsorship that gives us friends all round the world. Almost from the beginning of ALARA we have had reciprocal sponsorship with YL groups in other countries. We sponsor someone into ALARA and we are sponsored into their YL organisation in return. We receive newsletters from overseas and our sponsors receive the ALARA Newsletter. We exchange letters and gifts at Christmas or exchange emails all the year. How seriously you keep in contact is up to you.

I hope to have an 'eyeball' with several YLs this year. You will hear all about it when it happens! For the technically minded, I hope to send emails from my mobile phone.

The Adelaide Luncheons

The numbers attending the luncheons in the Museum are growing. It is great that our city is small enough that most people can come to Town once a month. When there is a reason (or even when there is no reason) we have a special theme to the luncheon.

We have Red Hat days every now and then and may have yellow hat days

soon (after all the ALARA colours are black and yellow) and when the second Friday falls on Friday 13th, we have a black cat day.

We all made pink roses one day when someone brought along some pink ribbon and showed us how to make roses. Do join us if you have not done so, up to now. The second Friday of the month at the Museum café at 12.00.

The YLs in Perth also have regular luncheons on the third Friday of the month, but unless they tell me about them and send me photos, I can't tell everyone else!

Hint! Hint! Please. If you do anything interesting tell me and tell Dot VK2DB so others can know.

New ALARA office bearers

President:	VK3DMS Marilyn Syme
Vice President 1	VK5TMS Tina Clogg
Vice President 2	VK5JSH Shirley Tregellas
Secretary/ Treasurer	VK7LUV Susan Brain
Souvenir Custodian	VK4AOE Margaret Schwerin
Minute Secretary	VK5ANW Jenny Wardrop
Publicity Officer	VK5CTY Christine Taylor
Award Custodian	VK3XBA Kathy Gluyas
Historian/ Librarian	VK5JSH Shirley Tregellas
Contest Manager	VK3DMS Marilyn Syme
Sponsorship Sec.	VK5BMT Maria McLeod
Editor	VK2DB Dot Bishop
VK1/2 State Rep.	VK2DB Dot Bishop
VK3 State Rep.	VK3OZ Pat Pavey
VK4 State Rep.	VK4PTO Pam Benner
VK5/8 State Rep.	VK5TSX Jean Kopp
VK6 State Rep.	VK6DE Bev Hebiton
VK7 State Rep.	VK7NAW Roasanne Webb
Public Officer	VK3WX Robyn Gladwin

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AMSAT

Bill MagnussenVK3JT

Packet Radio Satgate System to close

On April 26, Roy Welch W0SL reported that after many years of packet message forwarding via UO-22, GO-32 and AO-51, the Satgate System will close due to a lack of traffic being handled. The total of thirty five worldwide stations in the system a few years ago has dwindled to a mere handful due to this lack of traffic. Maintenance problems, changes of QTH and Silent Keys also took their toll.

Roy went on to say, "The system was begun long enough ago that I have lost track of the date. It was given birth by David Medley KI6QE, who was in California at the time. The chief Guru and driving force over the past partial decade has been Andrew Sellers G8TZJ, who gets credit for developing the software which permitted the Satgate stations to operate in fully automated mode. Traffic was accepted from the terrestrial packet network using BBS programs like the F6FBB program and routed to the satellites via the WiSP software program. It was also downloaded from the satellite and routed into the terrestrial packet network untouched by human hands, all thanks to Andrew. My appreciation goes to David for establishing the Satgate System and to Andrew for his effort in keeping this Network going. Thanks also to the remaining few of the Satgates who will be shutting down".

In these times when the internet and its WWW are all pervasive, it may be difficult for newcomers to imagine how important the packet radio networks were in exchanging vital information for satellite users in the early years. Before packet, EQXs and Keps were labourously read out over HF nets and copied by hand onto note paper or circulated in local newsletters. The packet radio system speeded this up greatly and of course accuracy was also improved out of sight.

At a time when only some Universities, a few big businesses and the Military had access to the internet, the problem remained of getting amateur radio related news from country to country and continent to continent. HF radio running at 300 baud filled the gap until the Satgate network was born. It did much to alleviate the situation and at one point it was a major carrier of international packet radio news and private mail. The UoSats and their derivatives and the ubiquitous WiSP software as mentioned above by Roy contributed enormously to the success of the Satgate venture as a whole.

Although it all seems "old-hat" compared to today's communication techniques, packet radio and the Satgate network were right up there with the best of amateur radio practice not all that many years ago. It served us well and stalwarts like Roy, David, Andrew and dozens of others, including VK Satgate operators like VK4CJO and VK2XGJ, are to be congratulated on their massive contribution to amateur radio. The selfless commitment of time, equipment and effort required to keep a Satgate station on the air 24 hours a day, 7 days a week for many years is worthy of hero status. Modern transceivers, full AZ/EL auto-tracking of antenna arrays, dedicated computing software and hardware, constant attention to updating Keplerian elements and the normal day to day maintenance issues associated with such a station meant total dedication from those 40-odd souls who put in the hard yards over those years. Together they brought vital information to one and all in the wider satellite and packet radio community. Congratulations to them all and a thousand thanks for a job well done.

SSETI-ESEO launch date delayed

AMSAT News Service reports that the launch date for SSETI-ESEO, the ESA led student satellite project intended for Geostationary Transfer Orbit (GTO), has been delayed by approximately one year.

It had originally been hoped that this satellite would be a secondary payload on an Arianespace launch from Kourou in late November 2008, but it now seems that the expected secondary payload opportunity will not be available. Although this delay is regrettable it will give the various teams much needed extra time to finalise and test their systems. A BBM - "Breadboard model" of the satellite systems and payloads is being produced at the ESTEC facility in the Netherlands for testing purposes. This will commence operations during this summer.

Work continues to develop the AMSAT-UK communications package that is planned to provide a 435 to 2400 MHz (Mode U/S) linear transponder using both analogue and DSP based systems. It will additionally downlink telemetry at 400 bps and provide command and ranging facilities. Full details of the project are available at http://www.uk.amsat.org/ click on "News Archive" and then "SSETI".

It's been some months now since I first mentioned ESEO, so I'll refresh your memory and hopefully spur you on to complete that HEO ground station. ESEO is to be a high earth orbiting satellite that

The AMSAT group in Australia

The National Co-ordinator of AMSAT-VK is Graham Ratcliff VK5AGR. Contact Graham if you wish to be placed on a mailing list for breaking news and net reminders. As a forum for members, AMSAT-VK operates two monthly nets.

AMSAT-Australia Echolink Net

The "Echolink" net meets on the second Sunday of each month. Anyone with an interest in Amateur Radio Satellites is welcome to join the net. Graham VK5AGR acts as net controller. The net starts at 0500 UTC during summer time periods and 0600 UTC during winter standard time periods. Connect to the AMSAT conference server on Echolink a few minutes before these times.

AMSAT-Australia HF net

The HF net meets informally on the second Sunday of each month. In winter (end of March until the end of October), the net meets on 3.685 MHz at 1000 UTC. In summer (end of October until end of March), the net meets on 7.068 MHz at 0900 UTC. Start listening 15 minutes before these times.

All communication regarding AMSAT-Australia matters can be addressed to:

AMSAT-VK
9 Horner Rd
Clarence Park SA 5034

Graham's e-mail address is:
vk5agr@amsat.org

will carry an amateur radio payload into GTO, that is Geostationary Transfer Orbit. The average GTO is highly elliptical, having a perigee of about 300 km and an apogee of about 40000 km. Its inclination and final shape will depend to a large degree on the planned orbit of the parent payload. Thus its orbit will have many of the characteristics of an AO-10/13/40. The spacecraft itself though is a micro-satellite. It will not have the power or facilities of a HEO designed for amateur radio service. You will need to gird up your loins and build a first class ground station to cope. Do not expect to make do with a hand-held radio and hand pointed short Yagi, except for very brief periods around perigee. If you have a HEO ground station or are putting one together in anticipation of P3E, that should do nicely.

The SSETI spacecraft ESEO, European Student Earth Orbiter, is built on a micro-satellite platform some 60 x 60 x 70 cm in size, designed, built and operated as the first SSETI mission by the European students working in a network of participating universities. In addition to the satellite platform, the whole system consists of the payload carried by the spacecraft and the associated ground segment. The primary system will use transmit and receive frequencies in the commercial space allocation at 2.2 GHz band. This will use PSK at 9600 bps or 2400 bps. The secondary system, provided by AMSAT-UK, will have a 50 kHz wide mode U/S transponder with an AO-40 format 400 bps BPSK beacon. The frequencies have not been applied for yet but AMSAT-UK is working on 436 and 2401 as 'nominal frequencies'. The beacon will normally send telemetry on the spacecraft's general health but can be configured to send data from the various experiments on board.

Amateur satellite beginners article

Making that first move into any new area of amateur radio is likely to be daunting. Nowhere is that more true than the deep well of amateur radio satellites.

A number of "Getting Started" articles are available from a variety of sources. The March 2007 issue of the RSGB magazine RadCom features such an article entitled "Getting Started on Amateur Radio Satellites" by John Heath G7HIA. It is an excellent introduction to the exciting world of amateur satellite communications. The Radio Society of Great Britain and the author have generously agreed to allow AMSAT-UK to put a PDF file of the article on their web site. It can be seen at http://www.uk.amsat.org/ Click on "How Do I Start" on the left hand side of the home page then click on "Getting Started on Amateur Satellites (RSGB article)".

Telemetry collection – an old art revived.

It may not be for everyone but the activity of telemetry collection is one that fascinates many satellite users. Now is a good time to sharpen up your skills, perhaps for greater things to come.

Back when intercontinental DX was an everyday happening on the HEOs one of my favourite activities was to keep in contact with friends in Scandinavia, where the old family was deeply rooted.

My very next favourite activity, usually when that part of northern Europe wasn't in the footprint was to collect and decode telemetry. Many other VKs shared this passion and we would sit for ages glued to our computer screens watching the 400 baud beacons flooding our systems with data. There are many today who would cast doubts on the validity in this modern technological age of baud rates as low as 400 but it is well to note that for deep space probes, NASA uses very low baud rates when signals are extremely weak, even to their large antenna arrays.

It is good to know that AMSAT has stuck to that telemetry format for its HEOs and – guess what – all the old gear will be coming out of storage again as soon as P3E hits our skies.

In the meantime, what to do if your interests turn to telemetry? The current batch of tiny Cubesats that are being launched afford the telemetry buff a great opportunity to sharpen their skills and do the satellite builders a favour at the same time. Messages often appear on the BB asking for help in telemetry collection. The files can be of vital concern to the people, many of them University students who were involved in these projects from the planning stages.

So, what is required in the way of gear? Fortunately, not all that much. It is the sort of thing that should be within the grasp of just about any satellite user. Bob Bruninga's PCsat series use AX-25 protocol, so your old packet radio TNCs can come out of storage for those satellites. The Cubesats pretty well all use 1200 baud AFSK for their telemetry. These days, sound card software is available if you don't have a hardware decoder. The Cubesats have a relatively short life and things change almost from day to day, with new launches happening regularly.

Have a look at the AMSAT-NA web site to get the latest information on how to do your TLM collection and where to send files. It is great fun and your few bits of digital information may just be the missing link in solving some problem for the designers or proving a new aspect of operations.

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VHF/UHF – an expanding world

David Smith VK3HZ – vk3hz@wia.org.au

Weak Signal

David Smith - VK3HZ

The weather conditions over the weekend of May 9th to 11th produced some unusually good conditions for the time of year. A slow-moving high-pressure cell passed across southern VK5 and seemed to squeeze itself between Victoria and Tasmania before heading up through VK2 and across the Tasman. This produced several days of very good tropo conditions across the southeast of the country.

The first sign of good conditions was noticed by Brian VK5BC, who was hearing 2 m beacons all around, including the recently revived VK7RAE on the north coast of Tasmania. Brian, Phil VK5AKK and Garry VK5ZK (Goolwa) were holding up the Adelaide end and worked a number of stations in Melbourne including Jim VK3II, Mike VK3AAK and Ron VK3AFW. Brian was also able to work up to Leigh VK2KRR at The Rock, near Wagga Wagga, with very good strength. The opening moved east so that the Melbourne – Mt Gambier path was extremely good with Colin VK5DK easily working VK3AAK on 23 cm. The path across to northern Tasmania was also lifted, with Brian working Norm VK7AC. At one stage, Dave VK3HZ worked Norm with S7-9 reports with both of them beaming towards Adelaide. Karl VK7HDX and Peter VK7LCW were also in on the action. As the high-pressure cell continued east, Brian VK5BC worked Rob VK1ZQR in Canberra over a very difficult path. Rob attempted a contact with Karl VK7HDX, but although Karl could hear some of Rob (4/1), Rob heard nothing over his local noise. On the evening of May 11th, Mike VK3AAK managed to work Phil VK5AKK on 23 cm – a 665 km path. The enhancement then moved out over the Tasman with the Hepburn Prediction page showing possible good conditions to ZL. However, there were no reports of any VK-ZL contacts.

Meteor Scatter

The Eta Aquarids meteor shower peaked on May 6th-7th. Reports from the regular weekend Meteor Scatter operations showed that the meteor rate was not much above the norm, but there seemed to be a lot more long burns, indicating much bigger rocks. However, the morning Aircraft Enhancement net saw some interesting contacts. Jim VK3II reports:

The time was 0825 EAST on Monday May 7th. I was just finishing an AE contact on 144.2 MHz with Don VK2RS. His signal was becoming weak when I heard someone coming in over the top of Don calling John VK1CJ. It turned out to be Rod VK4ARN. He called John twice with no apparent response, then Russell VK3VZP called Rod and exchanged signal reports. Next I called Rod and exchanged 5/5 signal reports.

Rod's signal was in for a minute or so - one very long meteor burn, or perhaps a string of meteors close together?

Via the VK Logger, I found that Wayne VK4WS had, on Tuesday morning, heard me for several seconds. On Wednesday, he copied the complete callsign of Rob VK1ZQR.

John VK1CJ adds: I thought I was talking to Trevor VK4AFL as I clearly heard the callsign at S4. However, apparently Trevor was not on at the time. That was Monday and I heard several burns that morning that lasted 20 seconds or so. The morning before, Sunday, I heard 2 VK4's talking to each other for about 15 - 20 seconds but could not call them at the time due to heavy VK3 traffic coming in the back door. On Tuesday morning I heard fainter signals from VK4 but not Q5. Wednesday morning nothing heard. On Thursday morning, Col VK2KOL told me that VK4ARN and another were clearly hearing me again. I heard very weak signals from VK4 but not good enough to work.

WIA AGM

Barry VK3BJM and I recently did the long trip from Melbourne to Parkes for the WIA AGM and visit to The Dish at Parkes. Barry takes up the story:

My mobile station had a long-overdue workout on the run up the Newell Highway to Parkes and back. We departed very near to the scheduled time of 0800 AEST on Friday morning, and heard bits of contacts for the first hour. Heard and worked were Jim VK3II and Ron VK3AFW; heard but not worked were John VK1CJ and Rob VK3XQ. After our last contact with Jim (at about 1000 AEST), things fell quiet.

We met with Leigh VK2KRR at his place at The Rock, and, whilst parked outside, the VK3RGL 2 m beacon was quite audible (via AE). Using Leigh's station, a quick chat was had with Alan VK3XPD and Trevor VK3VG, who were alerted to be on the hear-out for us once we got mobile again. However, once we left The Rock and got close to Wagga, we lost the VK3RGL beacon signal, and nothing more was heard from down south, despite many CQ's. We arrived in Parkes at 1930 AEST without any further contacts.

Parkes is an excellent location for Aircraft Enhancement. It lies directly under the Brisbane-Melbourne flight path and is also crossed by large internationals heading out of Sydney to the northwest. The skies over the weekend were clear and blue, and criss-crossed with vapour trails from passing flights. On Friday evening, we were even treated to the spectacular sight of the Dish with the moon rising behind it, Jupiter nearby, and an aircraft passing overhead with vapour trail glowing in the moonlight.

So, on Sunday morning we shot up onto Bushman's Hill at the North end of Parkes (QF46cv), keen to "work the aircraft" on 2 m. We started calling at about 0815 AEST and in the following 45 minutes worked the following: Rob VK1ZQR, John VK1CJ, Trevor VK3VG, Ted VK1BL, Mike VK3AAK, Mike VK2FLR, Adrian VK2FZ, Colin VK2KOL, Jim VK3II, Leigh VK2KRR, and Russell VK3VZP. Heard and very nearly worked was Brian VK3BBB – his 5x1 signal sank quickly into the noise before I could get a report back. Heard but not worked were VK2FABV and VK2KGX on voice, and VK3HY and VK2GKA on CW (if my reading of the CW was 100%). Oh, and Rex VK7MO/m2 with Peter VK3KAI at the microphone was also worked – 5x9+ mobile below us in Parkes!

Jim VK3II won the prize for the most distant station worked, at 640 km, narrowly beating Mike VK3AAK at about 633 km.

Those 45 minutes restored my faith in my system, although the VK3RGL 2 m beacon was still not being heard at all, which I found a little strange.

Mike VK3UBM joined Dave VK3HZ and me for the trip home and we left Parkes at about 1300 AEST. We were nearly at the VK2/3 border before the VK3RGL beacon was heard again - strange conditions. On the way back, via the Newell and Goulbourn Valley highways, we had a couple of brief contacts with Rex VK7MO/m2, who was travelling virtually a parallel route down the Olympic Way from Wagga to Albury, then down the Hume. Contact #1 with Rex at the Rock, as we arrived at West Wyalong; #2 with Rex 70km from Albury, when we were 60 km from Jerilderie; #3 with Rex on the outskirts of Albury, when we were 15 km out of Jerilderie (we'd stopped to take some photos; Rex wasn't flying...); and lastly with Rex in Bell St in Melbourne, as I pulled into my driveway in Kyneton. None of these contacts were very long in duration, or of a strength to threaten hearing, but were pleasing as mobile-to-mobile contacts at distances of between 100 and 150 km.

We also worked Leigh VK2KRR as we approached Jerilderie, and again as we arrived at my QTH.

All contacts were made using the Big Wheel antenna, 3 m of FSJ4-50, 150 W from a Mirage B5016 amplifier and an Icom IC-706MkIIG.

Holding the WIA AGM at Parkes, and incorporating an inside visit to the Parkes Radio Telescope, was a stroke of genius. Praise to Robert VK3KRB and those who assisted him in organising the weekend. They could only have topped it by gaining operational use of the dish for the day. We had to settle for a very close look and brilliant weather. Maybe next time?

EME

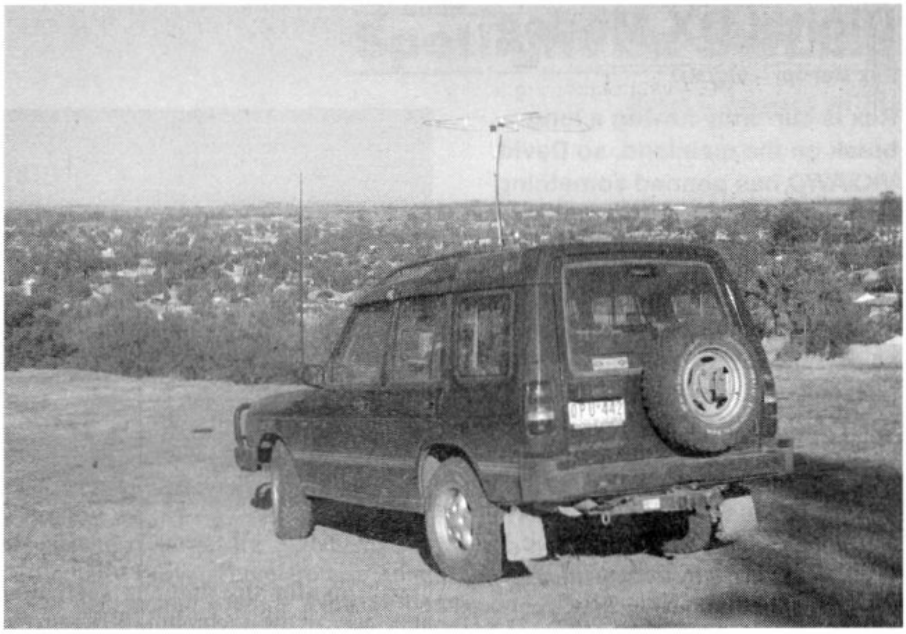
Charlie VK3NX has been busy building equipment and feeds for new bands for EME. After much success on 5.7 GHz and 10 GHz, he is now aiming for 3.4 GHz – a band that is sparsely populated, both for terrestrial and EME operations. Charlie reports:

I've had only a couple of contacts and new initials on 10 GHz. After extensive tests with F5VKQ, I seemed to be about 2 dB down due to feed "overmoding" problems. I have remade it in smaller diameter pipe and have achieved 34dB return loss - a huge improvement and I hope now to get more of that "precious" 10 GHz energy out and onto the dish.

I have fully set up the station now for 3.4 GHz. I have approx 90 W at the feed thanks to some surplus 50 W PA units and a homebrew splitter / combiner arrangement. The feed is a scaled replica of my 5.7 GHz "screw polariser" and with circular polarisation, it should make it easier to have contacts with both North America and Europe without having to manually switch feed polarity as I do on 10 GHz. I have noticed that heavy cloud cover attenuates the 3.4 GHz signal by as much as 1.5 dB, as evidenced whilst I was doing sun noise measurements.

I should have some skeds very soon, and an "activity" weekend is planned for June, with the 9 (!) stations currently QRV worldwide on 3.4 GHz EME. As with 2.4 GHz, there is a discrepancy between the world-wide band allocations, and I've had to build a 2nd LO and switching arrangement, to be able to receive the NA stations on 3456 ...hopefully!

Doug VK3UM has released updates to his popular suite of EME and EMR programs. The software is available for download from a number of sites including: www.ve1alq.com/downloads/software/vk3um.htm



Barry VK3BJM at Parkes

The release includes:

- Transmission Line Calculator Ver 1.08
- EMR Calculator Ver 6.02
- EME Calculator Ver 3.05

Doug also mentions that John VK5DJ has undergone extensive heart surgery and is making a rapid recovery. The interfacing between John's Tracking System and EME planner is complete. More details at: www.corprit.net/~jdrew/Beam/Beam.html

VK-VHF Email Reflector

The VK-VHF email reflector has been moved to a new host. The address has changed to: lists.vk2djg.net/mailman/listinfo/vk-vhf. Otherwise, it's business as usual.

Please send any Weak Signal reports to David VK3HZ at vk3hz@wia.org.au.

Digital DX Modes

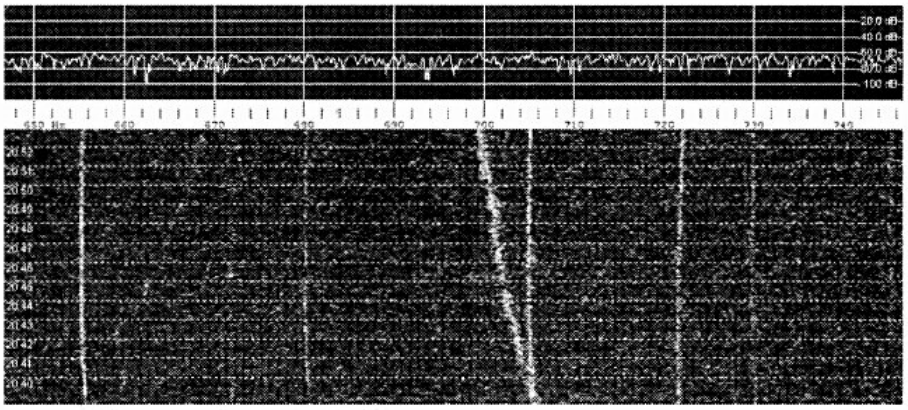
Rex Moncur – VK7MO

Rex is currently having a long break on the mainland, so David VK2AWD has penned something for this month.

With weak signal VHF work, it is useful to have more than one way of assessing the performance of your receive system. A distant TV signal received via Earth-Moon-Earth (EME) can provide a repeatable way of doing this. In my case, I periodically check the Channel 5A TV vision carrier signal on 138.250209 MHz from Mawson in Western Australia via EME.

While the signal is inaudible, it is often visible as a single fuzzy line trace on my computer monitor using the Spectrum Lab program with a FFT bin width of around 170 milliHertz. This program needs to be run on a reasonably fast PC with a suitable soundcard connected to the low level audio output from the radio. To receive these signals, you will also need to run a suitable moon-prediction program (e.g. Ztrack) that will give you the moon azimuth and elevation along with the Doppler shift for various times at both the transmitting and receiving sites.

A 10-element Yagi for the 2 metre band, which will work at 138 MHz (albeit with slightly reduced performance) should be sufficient for the antenna. I use 2 x 13 element Yagis and an FT-847 radio (with no external preamp) at my station in QF56ng. Some vertical elevation capability for the antenna system is necessary, as the maximum ERP from the TV station antenna is in the low elevation range (e.g. 0 to 4 degrees), when the moon elevation at the receiving end is reasonably high (e.g. greater than 25 degrees elevation). The higher elevation at the receiving end also helps to provide a quieter receive environment.



Channel 5A Mawson WA via EME

I use the stable vision carrier signal from Channel 5A at Newcastle on 138.276025 MHz as a reference to manually correct for any receiver frequency readout error or drift. I normally place the EME signal at around 700 Hz offset. Both the Newcastle TV dial reading and Doppler shift are entered into a simple spreadsheet program, which calculates the dial frequency needed for receiving the EME signal.

The screen dump shows the 8 September 2006 traces from Channel 5A TV Mawson EME signal (single sloping fuzzy line due to changing Doppler shift over time) and the Newcastle terrestrial signal side bands (multiple and almost vertical traces).

The technique might also be used for other TV transmitting and receiving locations providing the relative moon elevation range is satisfactory, the TV signal is stable and the ERP from the transmitting site is sufficiently high.

Please contact Dave VK2AWD at QTHR if you would like more information.

Please send any Digital DX Modes reports to Rex VK7MO at rmoncur@bigpond.net.au.

The Magic Band – 6 m DX

Brian Cleland – VK5BC

April was an interesting month on 6 m with several openings to Japan, mainly from northern Queensland, as well as some sporadic E openings within Australia.

April 13th proved to be a good day with Trevor VK3VG at Cobram and Paul VK2YVG at Broken Hill working several JA stations. At the same time, Jeff VK4BOF in Atherton was copying Paul and the JA stations. JA1VOK reported working VK2YVG, VK3VG and VK4's ABW, BEG, FNQ & SIX all in northern Queensland. JA2HCB reported hearing the Alice Springs beacon VK8RAS and later the same day Brian VK5BC reported hearing the Townsville beacon VK4RTL.

Then on April 14th, both the Dampier VK6RSX and Townsville VK4RTL beacons were heard in Japan with several northern VK4's again working JA's. During this opening Jeff VK4BOF at Atherton made his first contact into Japan with JQ6RUP - well done Jeff.

Good openings to Japan again occurred on April 18th and 19th from the Mackay area with Andru VK4KAY and Kevin VK4BKP working into Japan on both days. On the 19th, Andru worked several JH1 stations whilst mobile.

On April 23rd, a good sporadic E opening between VK4, VK2 & VK5 occurred. Several stations were active in each state and the band was open for several hours. From VK5, stations from north of Brisbane to as far south as Wollongong were worked and the FK8 beacon was audible for some time. VK4s from as far north as Mackay worked into VK2 and VK1.

An unexpected opening lasting half an hour from VK5 to southern Japan occurred on Sunday 29th April at around 0800 UTC. Brian VK5BC worked JA6RJK, JA6TEW and JA6EXN, all with signals up to 5/9.

I received a note from John VK4TL near Atherton who reports:

On Wednesday 2nd May, the band opened to China and I was able to work BG4CZM and BG5HAR just

Robin L. Harwood VK7RH

Sunspots or global warming?

Well it is midwinter and although it is much cooler, it is also one of the mildest winters I have known. Maybe it is global warming. Has it affected shortwave propagation? Not as far as I can tell because propagation has been poor particularly above 10 MHz. It could also be the dramatic decline in frequency occupancy from the major international broadcasters on HF. The sunspot numbers are very slowly climbing up and it will probably be spring or summer before we experience any noticeable improvement.

The major news this month was the unexpected closure of the remote controlled receiving cluster known as Dxtuners. These have been operating since 1997 and over 1500 joined up as subscribers over that 10-year period. I found the facility invaluable as I am confined to a retirement village where I am not permitted to erect any outside antennas. No reason was given other than the webmaster wanted to pursue other interests and he said he could not find anybody to take it over. I can only find two web-based receivers online but they are using a different system from the Java based operation that was employed by Dxtuners. Both of them are based in the US and basically they take a 30-second snapshot of a particular channel and send it out as a WAV file. It is not a continuous operation like Java. I do hope that a successor to Dxtuners will quickly emerge.

Africa continues to be a target for international and clandestine broadcasts. As I previously reported, the Libyans have apparently taken over the Africa Numero Uno shortwave facility in Gabon. They are mainly operating between 17600 and 17650 in a crude jamming effort against clandestine broadcasters targeting North Africa, particularly Libya. There are also quite a few clandestine stations focusing on Sudan, Eritrea, Ethiopia and Somalia. Most seem to be transmitting from Europe and the former Soviet Union and programming is in various dialects and local languages.

Zimbabwe continues to be another target of clandestine and international broadcasters. Radio South West Africa emanates from London and originally commenced from senders in Botswana but lately has added sites in England as well as Eastern Europe. Reports indicate that the Zimbabwean Government, led by Robert Mugabe, has been actively jamming the broadcasts with assistance from China. As well, the Iranians are reported to be assisting with the construction of an external service to counteract the popularity of the opposition-based station.

The Canadian Time station CHU in Toronto apparently received authorisation to continue using 7335 in addition to 14670 but American religious broadcasters have registered the frequency and CHU has been suffering severe interference. Remember the 41 metre broadcasting allocation was extended to 7500 kHz and CHU seems out of place but CHU has been operating on this channel for many decades. It seems that the Canadian and American frequency planners are not communicating with each other.

I have recently heard China Radio International in English from 1300 to 1355 on 9760, 9730 and 5955. I do not know from what sites they are broadcasting as their audio is not synchronised. 9760 and 5955 were the best as far as signal strength are concerned and the other 9 MHz channel was down quite a bit. Radio Pyongyang in the Korean Democratic Republic must be experiencing problems acquiring replacement parts for their senders because they are particularly unstable. They appear to be on a different channel each day and the senders drift about wildly. Just listen on 7200 and you will hear it yourself.

Well that is all for June and don't forget you can forward news to me at vk7rh@wia.org.au.

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VHF-UHF: an expanding world *continued*

after 0815 Z. Then VK4BEG worked another Chinese station. T88KL was then contacted at 0839. He was working one JA station after another and it was very difficult to pick out the call. I got the last two letters and looked up on the loggers. I then called him and he came straight back. I also heard a JD1 Volcano Island, but don't know which one. The band has been a bit quiet since then.

On May 7th, Scott VK4CZ in Brisbane reports hearing both the VK7RAE northern Tasmanian beacon and VK7RST Hobart beacon and working Joe VK7JG in Launceston. On the 8th, Norm VK3DUT worked Rod ZL3NW near Christchurch. At the time, ZL TV audio was also audible in VK5.

Remember to keep listening on the band during June for the usual mid winter sporadic E openings.

Please send any 6 m information to Brian VK5BC at bcleland@picknowl.com.au.

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DX – News & Views

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E-Mail: john.bazley@bigpond.com

As I am writing this column, Swains Island KH8/S DXpedition has taken place with over 115,000 QSOs in the log. Scarborough Reef has just finished with nearly 45,000 QSOs. When you consider the circumstances under which they were operating it is a superb achievement. They really have had to put up with the fiercest criticism I have ever seen on the DX cluster aimed at a DXpedition. The following is a message received from the BS7 boys on the third day of the operation:

It is now day 3 on Scarborough with operations going for 48 hours.

All 4 operating positions are built and the team has gone from survival en-route, to survival while building, to survival while in QSO mode.

(Have another look at the photographs in last month's magazine!)

Everyone on the team has cuts from the coral. The closest access to any of the rocks is over coral and no one has been spared coral scrapes and cuts. Add to that over 100 degree heat and sunburn and you have a dangerous environment for all.

During the day each shift is 6 hours in heat and a dry wind under a small umbrella. If you are lucky enough you get to operate at night. You are left on a rock for 13 hours barely 4 feet above the water in pitch black sitting in a folding chair, nowhere to walk and stretch and getting a constant salt spray. You cannot see the other rocks nor the ship and if something goes wrong there is no chance of rescue.

The SteppIR verticals and one Yagi are up. Two stations will stay on 20 m while the other two will search 15, 17, 30 and 40 for openings.

So as you sit there in your comfy shack complaining on the cluster and sending us emails about your lack of a QSO and the do's and don'ts, think what our team is going through to bring you "the chance of a QSO".

That really says it all!

We have since last month a further update on the predicted future of the current Solar Cycle. The U.S. Department of Commerce, NOAA, Space Environment Centre has released the new updated predicted minimum. The good news is they are now saying July instead of September, with a predicted solar flux average of 75.0. The complete chart can be seen at http://www.sec.noaa.gov/ftpdir/weekly/Predict.txt . The prediction values are based on ISES cycle 23 forecast of 13-month running smoothed values. We are getting close to the bottom of the cycle. Start working on those improved antennas for 10 and 6 metres! For those of us that cannot get beams up for whatever reason, do not be too disheartened, when particularly 10 metres opens up again. A half wave vertical with the bottom 3 to 4 feet above ground is an excellent antenna. From personal experience, it is extremely competitive as the band is opening and closing for long haul DX. Okay, you will struggle against the beams when the band is wide open but the opportunities will be there.

Following my comments last month regarding VKs and DXpeditions, I have received the following email from Roger - G3SXW – who I know needs no introduction!

It is clear that DXers in VK, ZL, KL7 are often disadvantaged by DXpeditions. DXpeditioners face a range of decisions during their operation: bands, modes and especially times. I think we all know the core problem: the big majority of DXers are in the northern hemisphere, so that is where there is most demand. But I do have a couple of suggestions to ponder.

Firstly, I have noticed that the nationality of DXpedition operators influences their choice of operating times & frequencies, so that they can work back home. I certainly prioritise openings to UK and am not ashamed to say so. We have also noticed that American operators prioritise USA openings. This is quite natural human psychology. So, maybe more Australians should go on DXpeditions to countries that are Needed by VK DXers? !

Secondly, DXpedition operators need to do their homework about difficult paths and then also to have the ability to take advantage of them when those openings occur. If I hear a VK or a KL7 in the pile-up I should immediately think: "The band is open in that direction, I should now try to work them". It's not easy to keep your wits about you when the pile-up is howling and you're struggling to keep control and to log them as fast as possible. VK DXers should not hesitate to e-mail DXpedition operators before the trip to alert them to potential openings. But be brief - just pick one or two prime openings to suggest! I very seldom receive such e-mails before a trip, and I do welcome them. It's not being pushy.

Yes, the difference in propagation between VK6 and VK4 is huge. The trouble is that there are so few callers from these areas that DXpedition operators have trouble building experience about the openings. In CQWW CW, for example, we (TZ5A last year) study this very carefully. But it's not easy. The openings are not predictable and if stopping the pile-up with "QRZ VK ONLY" there is often no other VK calling, so that's just wasted time.

The main issue is that most DXpeditions are too brief to be able to unearth all the unusual openings, and do justice to all the areas and bands and modes. Only the huge projects, like Five Star DX trips with up to 40 operators, have that luxury. This is my reason for not usually doing 160 metres these days; it is just too time-consuming and detracts too much from the mainstream bands. But it also helps to explain why smaller populations are not prioritised.

There is some good news though: any time I work a rare country I get a quick adrenalin rush. This happens every time I work a VK, from anywhere, on any band! Thanks to all VK DXers for being there. I look forward to working you all on all of my future trips!

73 de Roger G3SXW.

Some very interesting points from Roger - any comments from the VK DX fraternity? My email address is at the top of the page.

As I write this, Vladimir UA4WHX is back on the mainland of Tanzania in the

capital Dar es Salaam. As always he's not sure how long he will remain at this stop and is not revealing his next stop. It appears that Vladimir plans to continue the African junket for another couple of months. So hold off on all of your QSLs to UA4WHX until he gets back home. In the mean time here is a preliminary listing of Vladimir's current Trip:

May 2005 to date - Middle East, Africa and Indian Ocean
May 2005 - OD5/UA4WHX, ST2KSS
June 2005 - ST2VB, J20VB
August 2005 - J20VB
September 2005 - 5Z4/UA4WHX
October 2005 - 5Z4/UA4WHX
November 2005 - 5X1VB, 5H3VMB
December 2005 - 5H3VMB, 7Q7VB, Z2/UA4WHX
January 2006 - 7Q7VB, Z2/UA4WHX, 4K0VB, 4L0B
February 2006 - 7Q7VB
March 2006 - C91VB, 5Z4BU, 3DA0VB
April 2006 - 3DA0VB
May 2006 - 7P8VB
June 2006 - 5Z4BU, 7P8VB, Z2/UA4WHX
July 2006 - Z2/UA4WHX, 9J2VB, V51VV
August 2006 - V51VV, A25VB, V51VV/P
September 2006 - 9J2VB, A25VB
October 2006 - V51VV, D20VB
November 2006 - 9J2VB
December 2006 - C91VB/4, C91VB/6, 5H3VMB/5
January 2007 - 5H3VMB/5, 5H3VMB, 5H3VMB/3,
February 2007 - 5H3VMB, D60VB, 5R8VB
March 2007 - 5R8VB, D60VB, 7Q7VB
April 2007 - 7Q7VB, 5H3VMB/3, 5H3VMB

All of Vladimir's operations from trip 1 and 2 have been approved by the ARRL DXCC Desk and most have received their QSLs for those first two trips. Again the above will be updated and resent once Vladimir is back home in Russia later this year.

OD5 Pablo CT1EFS is currently in Shama near Tyre in southern Lebanon, where he will be staying until June 2007. He is waiting for authorization from the local government to operate as OD5/CT1EFS. He has mounted doublet antennas for 15, 17 and 20 meters and soon for 40 metres. Plans are to operate both CW and SSB daily around 1730Z. He also has 6 metres. QSL route to be announced later.

XF4 Carlos XE1YK, The President of Mexico's FMRE, has announced the dates for an XF4, Revillagigedo, expedition to celebrate the 75th anniversary of FMRE. It is a full month long: November 15-December 15. Paperwork for the permission will be initiated this week with a request for the callsigns 6E4LM and XF4YK .The operators will focus on 160 m and 6 m, where they feel XF4 is most needed, but will be on the other HF bands as well, with a goal of 25,000 QSOs. They plan a hundred-watt radio and simple antennas. An FMRE Board meeting April 24th will start the operator selection process. XE1YK operated as XF4YK in 1973.

9V1 QRZ DX reports that 9V1AP is the new call for Irwin KD3TB, who is now living in Singapore until July 31st. He'll be mostly on PSK31 with some SSB activity. QSL via KD3TB.

6W Dani EA4ATI is returning to Dakar, Senegal, and will remain there until April 2008. He expects to be active as 6W/EA4ATI and 6W1EA, probably with a beam for 10, 15 and 20 metres, and dipoles for the other bands. QSL direct via homecall.

9A Gianfranco I6GFX and Luca I6QIZ will be active as 9A/I6GFX from Croatia on 23-28 June. Their main QTH will be on Murter Island (not IOTA, IOCA CI-074), and they plan to go and operate from a few EU-170 counters: Arta Vela (CI-004), Kornat (CI-042), Murvenjak (CI-075), Radelj (CI-097), Vela Smokvica (CI-107), Vrgada (CI-143) and Prisnjak Mali (CI-488). QSL via home call, direct or bureau. Logs at http://www.gianfrancogervasi.it/search.html

Happy DXing.

Special thanks to the authors of *The Daily DX (W3UR), 425 Dx News (I1JQJ) and QRZ DX* for information appearing in this months DX News & Views.

For interested readers, you can obtain from W3UR a free two week trial of *The Daily DX* from www.dailydx.com/order.htm

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Over to You

The VK5BUG "Blackbelter"

I've just read VK5BUG's "Blackbelter" antenna article in the May edition of AR magazine. While it is an interesting article, I'd like to comment on a few things. Firstly, I was amused to read the comments in regard to vertical antennas about "no definable noise problems from them when compared to various horizontal types, contrary to what some literature might state". Sadly, my own experience is the opposite. All of my vertical antennas have shown a very high degree of (mainly power line) noise pickup compared to other antenna types such as full wave loops and inverted V dipoles. I think VK5BUG should consider himself exceedingly fortunate to be living in a QTH free of noise!

Secondly, his use of 'above ground counterpoises' made me smile, as some years ago a space saving 'sloper' design I presented in AR magazine also used an 'elevated radial'. In fact in that article from August 1996, I recall mentioning that, "In conclusion, I must say that the elevated radial is the key to good performance with this antenna". I suspect that the same thing applies with VK5BUG's antenna design.

Thirdly, the comments relating to transmission lines and balun performance are refreshing, however when it comes to baluns, they definitely have their uses. I share VK5BUG's suspicions and concerns about 'toroidal' baluns. All of my various baluns are wound on ferrite 'rods' for precisely the same reasons of potential loss and other deficiencies possible with toroidal construction. On baluns generally, I have used 4:1 voltage mode baluns wound on ferrite rods, as designed by Les Moxon G6XN (SK) with excellent results, and also in more recent years, simple rod wound 1:1 current mode baluns (essentially a bifilar wound common mode RF choke), also with excellent results. These 1:1 current mode baluns have some quasi- magical properties, such as apparently being able to effectively compensate for incidental (current) asymmetry in a nominally balanced antenna load. Indeed, they are useful for feeding a dipole with balanced feeder for reasons of reduced noise pickup. So baluns are not all bad, after all!

Felix Scerri VK4FUQ.

Hamads *classifieds* FREE

FOR SALE NSW

•Square wave generator 100 kHz to 15 MHz SYNTEST. 19 inch rack mounting 240V. Can be synchronised with external 10 MHz input. Programming (GPIB?) input. Thumb wheel frequency selection. Photos, more details vk2dvw@hotmail.com, $30 plus postage. John VK2DVW QTHR 0409 821 357

WANTED NSW

•2 x 572B valves as per FL-2100B PA VK2YO QTHR 02 6674 2095, N Chivers.

FOR SALE VIC

•TET EMTRON antenna HB35C 3 kW 5 el Tri band in good condition new reflector $ 450 Contact Jim 03 9367 6920 18 Thornhill Drive Keilor Downs 3038

WANTED VIC

•TONO/DRAKE 9000e RTTY/CW terminal (not the 7000e) in top condition and full working order. Details to Damien VK3RX tel 03 5427 3121 or vk3rx@wia.org.au

•Parts required to restore/complete an AN/TRC24 Radio system: Transmitter, T-302/TRC; Power Supply, PP-685/TRC; Receiver, R-417/TRC; A Band Plug-in AM-1180/GRC; Amplifier/converter, AM-2537/TRA-25; Amplifier/Converter, AM-3204/TRC-24; Oscillator/Multiplier, 0-903A/TRC-24; Transformer, TF-167/TRC and any other bits and pieces for this radio. Thanks for reading this. John Eggington VK3EGG vk3rx@wia.org.au

•An old HALLICRAFTERS HT-37 AM/CW/SSB TX, either complete and operational or with some parts, incl. valves, missing? Missing valves would not be a problem, as I could attempt to source them elsewhere, if necessary. I am after this item specifically and accepting no substitutes because the HT-37 had exceptional transmit audio quality. Please be reasonable with the price. John L Wickham VK3ZK QTHR jlwickham@aapt.net.au Thanks for looking.

FOR SALE SA

•VK5JST Antenna Analyser kits(see AR article May 2006). Increased component and postage costs mean prices of this great kit will rise from July 1 2007. Buy now and beat the increase! For more details see www.scarc.org.au; contact SCARC PO Box 333 Morphett Vale SA 5162, or email: kits@scarc.org.au

•Two FT-101E transceivers complete. One has transmitter fault, other has receiver fault, needs good service person. Price $60 each. Phone Murray VK5BVJ phone 08 87231001 QTHR Too heavy to post, pick up needed.

WANTED SA

•I am looking for a schematic for the 1963 vintage HEATHKIT Jr "Transistor Diode Radio Kit," or better still, the radio itself. The radio was marketed as the Model R-110. I'd be interested in the kit's instructions, assembly notes, or any other diagram that accompanied the kit. Phone Hank on mobile: 0403 285 940 or email vk5jaz@hotmail.com

•Service manual (or photocopy of) for CONN SERENADE 633 or 634 electronic organ. Will reimburse all costs. Ivan VK5QV QTHR (08) 8322 3668 vk5qv@esc.net.au

FOR SALE WA

•KENWOOD TS-450S AT-HF radio with mobile mounting bracket and manuals in original packaging $750. YAESU FT-757GX HF radio with mobile mounting bracket, operating manual and technical supplement $500. KENWOOD TR-9130 2 m all mode transceiver with mobile mounting bracket and manual $300. KENWOOD TR-2500 2 m hand held FM transceiver with mobile DC charger & bracket, AC charger and manual $150. 240 V AC to 12 V DC power supply $100. Multi tap HF mobile antenna $30. KENWOOD set of mobile HF antennas $30. 2 m mobile antenna $10. All reasonable offers will be considered. Contact: Alastair or Louise on (08) 9586 4244 answering service picks up after 10 rings. Unit 144 Erskine Grove Estate 19 Oakleigh Drive Erskine WA 6210.

MISCELLANEOUS

•*AMATEUR RADIO* MAGAZINE. I have a collection from December 1964 to the present and no longer have room to store them. Would be pleased to pass them on free, to any interested amateur. Brian Cook VK6BX QTHR, Email: rosbrian@iinet.net.au, Tel: 08 9339 2933, Skype: rosbrian

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The Wireless Institute of Australia represents the interests of all amateurs throughout Australia.

The WIA offers one year and 5 year membership for all categories except Concession Student. The fees for each category are Full members $75 ($365), Overseas members $85 ($403), Concession members (pensioner) $70 ($332), Concession members (student) $70, Full members no magazine $50 ($237), Family members $40 ($190)

National Office	Contact	News Bulletin Schedule
10/229 Balaclava Road Caulfield North VIC 3161, PO Box 2175 Caulfield Junction Vic 3161 Australia	Phone 03 9528 5962 Fax 03 9523 8191 10am to 4pm daily nationaloffice@wia.org.au http://www.wia.org.au	Subject to change. See www.wia.org.au follow National News prompts. Contact nationalnews@wia.org.au National VK1WIA news is distributed to all states.

Advisory Committees	Contact	News Bulletin Schedule
VK1 Australian Capital Territory VK1WX Alan Hawes VK1ZPL Phil Longworth VK1ET John Woolner VK1GH Gil Hughes	vk1advisory@wia.org.au	Sundays at 11.00 am VK1WIA 7.128, 146.950,438.050 Canberra Region Amateur Radio Club Email newsletter will be sent on request to president@vk1.ampr.org
VK2 New South Wales VK2QV Chris Flak VK2XCD Chris Devery VK2BFN Adrian Clout	Phone 02 9689 2417 vk2wi@ozemail.com.au vk2advisory@wia.org.au	VK2WI - Sunday 1000 and 1930 hours local.1.845; 3.595; 7.146; 10.125; 14.170; 28.320, 52.525; 145.600; 147.000; 438.525; 1273.500 megahertz. Plus regional relays. VK1WIA news included in the morning
VK3 Victoria VK3JJB John Brown VK3PC Jim Linton VK3APO Peter Mill	Phone 03 9885 9261 arv@amateurradio.com.au	VK1WIA, Sunday 11am and 8pm, 3.615 and 7.085 (LSB), 10.130 (USB), VK3RML 146.700, VK3RMM 147.250, VK3RMU 438.075.
VK4 Queensland VK4BY Don Wilchefski VK4ZZ Gavin Reibelt VK4KF Ken Fuller	vk4advisory@wia.org.au	VK1WIA, Sunday 9.0am via HF and major VHF/UHF rptrs
VK5 South Australia and Northern Territory VK5OV David Box VK5APR Peter Reichelt VK5ATQ Trevor Quick	Phone 08 8294 2992 boxesdnm@lm.net.au peter.reichelt@bigpond.com vk5advisory@wia.org.au	**VK5 South Australia** VK5WI: 0900 am local time. 1.843 LSB, 3.550 LSB, 7.140 LSB, 28.470 USB, 53.1 AM, 147.000 FM Adelaide, 146.900 FM South East, 146.925 FM Central North, 439.975 FM Adelaide North. **VK8 Northern Territory** 0900 local time 3.555 LSB, 7.050 LSB, 10.130 USB, 146.900 FM.
VK6 Western Australia VK6NE Neil Penfold VK6XV Roy Watkins VK6OO Bruce Hedland-Thomas	Phone 08 9351 8873 http://www.vk6.net/ vk6advisory@wia.org.au vk6ne@upnaway.com vk6xv@bigpond.net.au	VK6WIA: 146.700 FM(R) Perth at 0930hrs Sunday relayed on 1.865, 3.564, 7.075, 10.125, 14.116, 14.175, 21.185, 29.120 FM, 50.150 and 438.525 MHz, Country relays 3.582, 147.200 (R) Cataby, 147.350 (R) Busselton, 146.900 (R) Mt William (Bunbury).147.000 (R) Katanning and 147.250 (R) Mt Saddleback. Broadcast repeated on 146.700 at 1900 hrs Sunday relayed on 1.865, 3.564 and 438.525 MHz : country relays on 146.900,147.000, 147.200, 147.250 and 147.350 MHz..Also in "Realaudio" format from the VK6 WIA website
VK7 Tasmania VK7ZAX Phil Corby VK7DG Dale Barnes VK7KK Reg Emmett	Phone 03 6234 3553 vk7advisory@wia.org.au phil.corby@tassie.net.au vk7dg@wia.org.au regemm@ozemail.com.au	VK1WIA Sunday 9am on VK7WI network: 1.840 AM, 3.570 MHz LSB, 146.700 FM (VK7RHT South), 53.825 FM (VK7RAD South), 147.000 FM (VK7RAA North), 146.750 FM & 53.825 (VK7RNW North West), 146.625 FM (VK7RMD North West), UHF CB Channel 15 (Hobart) and 27 MHz CB - 27.225LSB (Hobart). Followed at 9:30am with VK7 Regional News Broadcast also on 7.090 LSB & 14.130 USB

Notes

1. Only three members of the state advisory committees are listed.
2. All listings are preliminary. They will be updated each month as required.
3. Membership application forms are available from the WIA web site www.wia.org.au or the national office address above.

WIA first Chris Jones Award presented to Mal VK6LC

WIA President Michael Owen VK3KI announced the first Chris Jones Award at the 2007 Open Forum at Parkes NSW on 5 May 2007.

The Award was presented to Mal Johnson VK6LC in recognition of his great contribution to amateur radio as the WIA Awards Manager.

Further details can be found on page 4, in the WIA News column.

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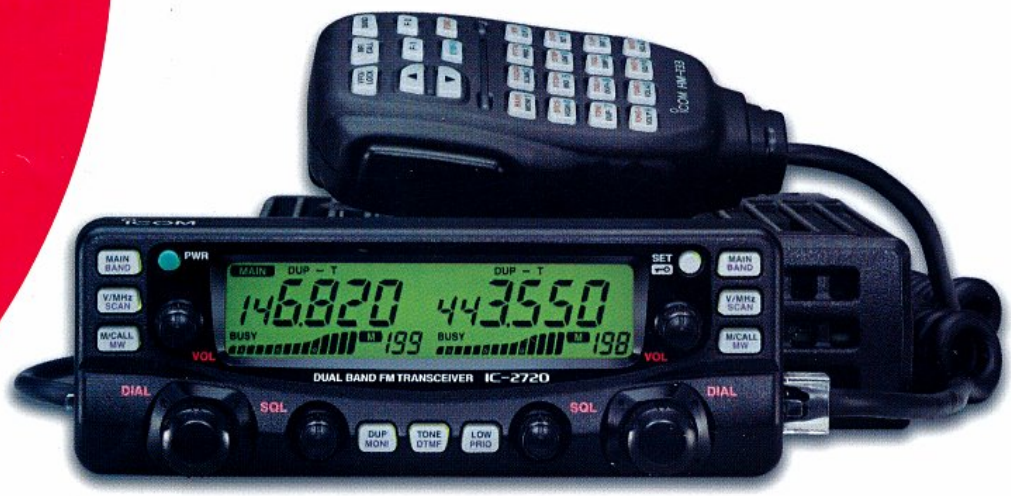

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